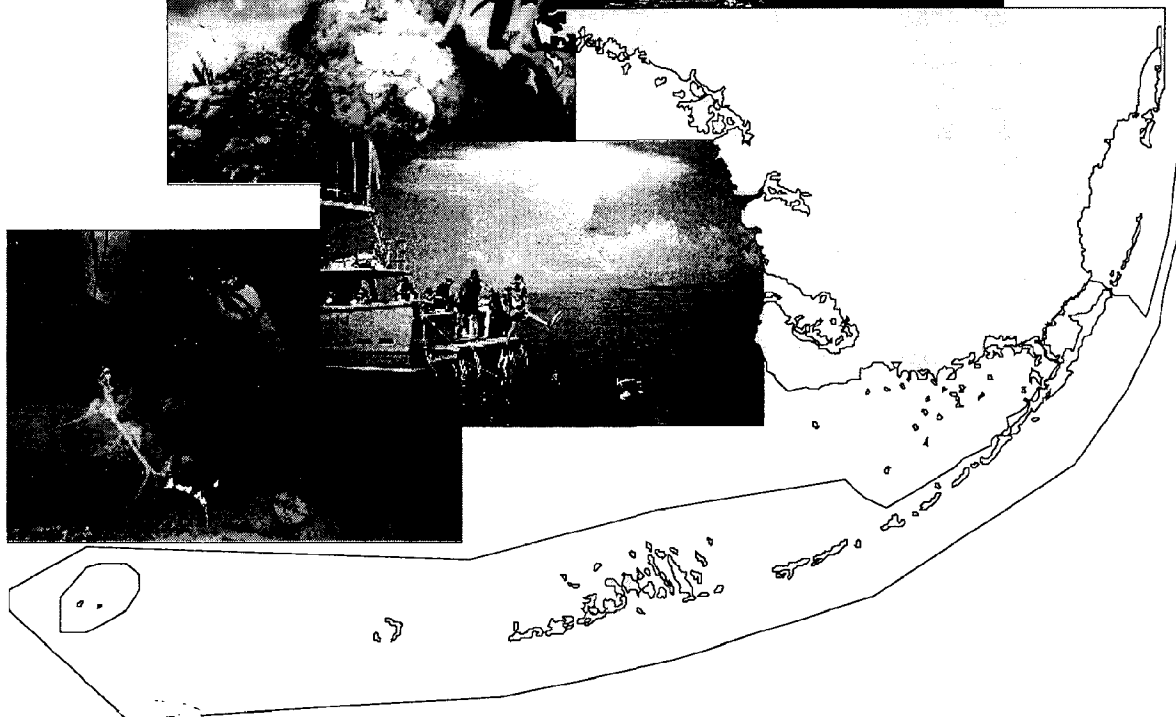
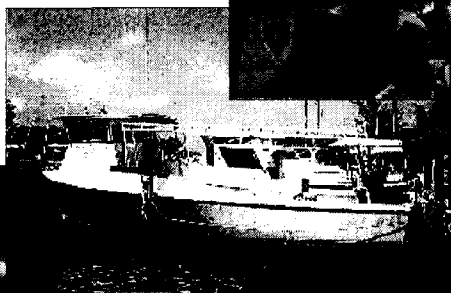


Strategy for Stewardship

# Florida Keys National Marine Sanctuary



U.S. Department of Commerce

National Oceanic and  
Atmospheric Administration

National Ocean Service

Office of Ocean and Coastal  
Resource Management

Sanctuaries and  
Reserves Division



## Final Management Plan/Environmental Impact Statement

Volume I of III  
Management Plan

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This final management plan and environmental impact statement is dedicated to the memories of Secretary Ron Brown and George Barley. Their dedicated work furthered the goals of the National Marine Sanctuary Program and specifically the Florida Keys National Marine Sanctuary.

*"We must continue to work together - inspired by the delight in a child's eye when a harbor seal or a gray whale is sighted, or the wrinkled grin of a fisherman when the catch is good. We must honor the tradition of this land's earliest caretakers who approached nature's gifts with appreciation and deep respect. And we must keep our promise to protect nature's legacy for future generations."*

- Secretary Ron Brown  
Olympic Coast dedication ceremony, July 16, 1994

*"The Everglades and Florida Bay will be our legacy to our children and to our Nation."*

- George Barley  
Sanctuary Advisory Council Chairperson

**Cover Photos:** Marine Educator--Heather Dine, Upper Keys Regional Office; Lobster Boats--Billy Causey, Sanctuary Superintendent; Divers--Harold Hudson, Upper Keys Regional Office; Dive Charter--Paige Gill, Upper Keys Regional Office; Coral Restoration--Mike White, NOAA Corps.

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# **Florida Keys National Marine Sanctuary**

## **Final Management Plan/Environmental Impact Statement (FMP/EIS)**

Volume I  
The Management Plan

1996

National Oceanic and Atmospheric Administration



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## Acknowledgments

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In 1955, renowned naturalist and marine biologist Rachel Carson described the Florida Keys this way in her book *The Edge of the Sea*:

"I doubt that anyone can travel the length of the Florida Keys without having communicated to his mind a sense of the uniqueness of this land of sky and water and scattered mangrove-covered islands. The atmosphere of the Keys is strongly and peculiarly their own. This world of the Keys has no counterpart elsewhere in the United States, and indeed few coasts of the Earth are like it."

This unique environment is the reason for the existence of the Florida Keys National Marine Sanctuary, and the reason why so many people have contributed so much of their time and energy to making the Management Plan as comprehensive and fair as possible.

Since 1989, numerous environmental organizations and individuals have worked long and hard to provide input into the legislation designating the Sanctuary and into developing the Final Management Plan/Environmental Impact Statement (FMP/EIS). They provided useful and objective comments at numerous workshops, Advisory Council meetings, and other public forums held during the planning process. The contributions of each of these individuals, and the organizations they represent, is appreciated.

The National Marine Sanctuary Program staff wish to thank everyone who has participated in the development of this plan, especially members of the public who gave of their time to offer objective and useful input during the many public comment periods offered during the planning process.

Special thanks go to the members of the Sanctuary Advisory Council for their major contribution to the planning process. Their diligent work and sacrifice of time and expenses will be remembered as the key to the success of developing a comprehensive management plan. With the leadership of their chairman and vice-chairman, they navigated waters never before charted for a National Marine Sanctuary or, for that matter, any marine protected area in the United States. Their role was crucial in this planning process, especially the leadership they exhibited in developing the Sanctuary's final plan. Never before has such a comprehensive plan been assembled by such a diverse interest group to solve complex problems in one of the Nation's most ecologically diverse regions.

In addition, Program staff would like to thank our local, State, and Federal agency planning partners for their assistance during the development of this plan. Those individuals who worked diligently for over four years on the plan sacrificed an enormous amount of time and effort to assist in this project. Dozens of agency scientists, managers, and planners have devoted time to this planning process, especially during the various workshops and strategy assessment planning sessions, extended review sessions, and deliberations on the compact agreement. The National Marine Sanctuary Program staff is grateful to all of you.

Also, special thanks to all of those individuals who reviewed various portions of the document, especially sections of the Description of the Affected Environment. Your thorough review has served to make this section an important reference for future use.

We also extend our appreciation to the Sanctuary Volunteers and staff and students of Indiana University who have helped assess some shipwrecks identified in the management plan.

Particularly, the Program owes special recognition and thanks to the staff of NOAA's Strategic Environmental Assessments Division for their enormous amount of time and sacrifice in assisting in the planning and development of this plan.

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## Abstract

This abstract describes the Final Management Plan and Environmental Impact Statement (FMP/EIS) for the Florida Keys National Marine Sanctuary. Congress, recognizing the degradation of this unique ecosystem due to direct physical impacts and indirect impacts, passed the Florida Keys National Marine Sanctuary and Protection Act of 1990 (Public Law 101-605) designating the Florida Keys National Marine Sanctuary. The Act requires the National Oceanic and Atmospheric Administration (NOAA) to develop a comprehensive management plan with implementing regulations to govern the overall management of the Sanctuary and to protect Sanctuary resources and qualities for the enjoyment of present and future generations. The Act also establishes the boundary of the Sanctuary, prohibits any oil drilling and exploration within the Sanctuary, prohibits the operation of tank ships or ships greater than 50 meters in the Area to Be Avoided, and requires the development and implementation of a water quality protection program by the U.S. Environmental Protection Agency and the State of Florida, in conjunction with NOAA.

The Sanctuary consists of approximately 2,800 nm<sup>2</sup> (9,500 km<sup>2</sup>) of coastal and oceanic waters, and the submerged lands thereunder, surrounding the Florida Keys, and extending westward to encompass the Dry Tortugas, but excluding the Dry Tortugas National Park. The shoreward boundary of the Sanctuary is the mean high-water mark. Within these waters are spectacular, unique, and nationally significant marine environments, including seagrass meadows, mangrove islands, and extensive living coral reefs. These marine environments support rich biological communities possessing extensive conservation, recreational, commercial, ecological, historical, research, educational, and aesthetic values that give this area special national significance. These environments are the marine equivalent of tropical rain forests in that they support high levels of biological diversity, are fragile and easily susceptible to damage from human activities, and possess high value to human beings if properly conserved.

The economy of the Keys is dependent upon a healthy ecosystem. Approximately four million tourists visit the Keys annually, participating primarily in water-related sports such as fishing, diving, boating, and other ecotourism activities. In 1991, the gross earnings of the Florida Keys and Monroe County totaled \$853 million, 36 percent of which came from services provided as part of the tourism industry. Another 18.7 percent of the gross earnings came from the retail trade, which is largely supported by tourists. In 1990, half of the Keys' population held jobs that directly or indirectly supported outdoor recreation. In addition, the commercial fishing industry accounted for \$17 million of the Keys' economy, more than 20 percent of Florida's total gross earnings from commercial fishing. All of these activities depend on a healthy marine environment with good water quality.

The purpose of the proposed Management Plan is to ensure the sustainable use of the Keys' marine environment by achieving a balance between comprehensive resource protection and multiple, compatible uses of those resources. Sanctuary resources are threatened by a variety of direct and indirect impacts. Direct impacts include boat groundings, propeller dredging of seagrasses, and diver impacts on coral. For example, over 30,000 acres of seagrasses have been impacted by boat propellers. Indirect impacts include marine discharge of wastes, land-based pollution, and external sources of water quality degradation. These and other management issues are addressed by the comprehensive Management Plan.

Volume I contains the final comprehensive Management Plan and includes the discussion of the Preferred Alternative and socioeconomic analysis as well as 10 action plans composed of management strategies developed with substantial input from the public, local experts, and the Sanctuary Advisory Council to address management issues. The action plans provide an organized process for implementing management strategies, including a description of the activities required, institutions involved, staffing requirements, and an estimate of the implementation cost. A list of the action plans in alphabetical order is as follows: 1) Channel/Reef Marking; 2) Education and Outreach; 3) Enforcement; 4) Mooring Buoy; 5) Regulatory; 6) Research and Monitoring; 7) Submerged Cultural Resources; 8) Volunteer; 9) Water Quality; and 10) Zoning. These action plans include several critical activities designed to manage and protect the natural and historic resources of the Sanctuary, including:

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- Establishing water-use zones providing focused protection for 60 to 70 percent of the well-developed reef formations, prohibiting consumptive activities in a small portion of the Sanctuary, buffering important wildlife habitat from human disturbance, and protecting several large reserves for species diversity replenishment, breeding areas, and genetic protection.
  - Establishing Sanctuary regulations to designate nonconsumptive zones, prohibit damage to natural resources, establish special-use permits, and restrict other activities that may negatively impact Sanctuary resources.
  - Expanding and coordinating the Enforcement Program to enforce the regulations, particularly in the zoned areas.
  - Implementing an Ecological Monitoring Plan to evaluate the effectiveness of the zoned areas and the health of the Sanctuary.
  - Expanding the Mooring Buoy Program to include the new zones and protect important coral reef and seagrass habitat.
  - Implementing a Channel and Reef Marking Program to protect seagrasses, coral reefs, and mangroves in shallow-water areas.
  - Implementing a Submerged Cultural Resources Plan to protect the numerous historically important shipwrecks and other submerged cultural resources.
  - Expanding the Education and Volunteer programs to reach more users and the millions of visitors coming to the Keys each year.

Volume II describes the process used to develop the draft management alternatives and includes environmental and socioeconomic impact analyses of the alternatives used in the draft management plan and environmental impact statement.

Volume III consists of the appendices, including the two acts that designate and implement the Sanctuary.

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# General Introduction

This is the first of three volumes describing the Final Management Plan/Environmental Impact Statement (FMP/EIS) for the Florida Keys National Marine Sanctuary. Volume I contains the selection of the Final Preferred Alternative, which is the Final Management Plan, including 10 detailed action plans. The Final Preferred Alternative explains the modifications to the Draft Preferred Alternative (III) based on public comments, the FKNMSPA, the NMSA and other considerations. Volume II describes the Management Plan/Environmental Impact Statement (MP/EIS) development process, including the process for selecting the Draft Preferred Alternative that underwent a nine month public review. Volume III contains the appendices referenced in Volumes I and II. The Final Plan is based on the EIS analysis in Volumes I and III.

## Authority for Designation

National marine sanctuaries are routinely designated by the Secretary of Commerce through an administrative process established by the National Marine Sanctuaries Act (NMSA) of 1972, 16 U.S.C. 1431 et seq., as amended, including activation of candidate sites selected from the National Marine Sanctuary Program Site Evaluation List. Sanctuaries also have been designated by an Act of Congress. The Florida Keys National Marine Sanctuary was designated when the President signed the Florida Keys National Marine Sanctuary and Protection Act. Appendix A in Volume III contains a copy of this Act.

## Terms of Statutory Designation

Section 304(a)(4) of the NMSA requires that the terms of designation set forth the geographic area included within the Sanctuary; the characteristics of the area that give it conservation, recreational, ecological, historical, research, educational, or aesthetic value; and the types of activities that will be subject to regulation by the Secretary of Commerce to protect those characteristics. This section also specifies that the terms of designation may be modified only through the same procedures by which the original designation was made. Thus, the terms of designation serve as a charter for the Sanctuary.

## Mission and Goals of the National Marine Sanctuary Program

The purpose of a sanctuary is to protect resources and their conservation, recreational, ecological, historical, research, educational, or aesthetic values through comprehensive long-term management. National Marine Sanctuaries may be designated in coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands over which the United States exercises jurisdiction consistent with international law. They are built around distinctive natural and historical resources whose protection and beneficial use require comprehensive planning and management.

The National Oceanic and Atmospheric Administration (NOAA) administers the National Marine Sanctuary Program through the Sanctuaries and Reserves Division (SRD) of the Office of Ocean and Coastal Resource Management (OCRM).

In accordance with the NMSA, the mission of the National Marine Sanctuary Program is to identify, designate, and comprehensively manage marine areas of national significance. National Marine Sanctuaries are established for the public's long-term benefit, use, and enjoyment. To meet these objectives, the following National Marine Sanctuary Program goals have been established (15 CFR, Part 922.1(b)):

- Enhance resource protection through comprehensive and coordinated conservation and ecosystem management that complements existing regulatory authorities.
- Support, promote, and coordinate scientific research on, and monitoring of, the site-specific marine resources to improve management decisionmaking in national marine sanctuaries.
- Enhance public awareness, understanding, and the wise use of the marine environment through public interpretive, educational, and recreational programs.
- Facilitate, to the extent compatible with the primary objective of resource protection, multiple uses of National Marine Sanctuaries.

## General Introduction

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The Florida Keys National Marine Sanctuary is one of a system of national marine sanctuaries that has been established since the Program's inception in 1972. Sanctuaries are not new to the Florida Keys; there is a twenty year history of National Marine Sanctuaries in the Keys.

### Background

**Historical Perspective.** The lure of the Florida Keys has attracted explorers and visitors for centuries. The clear tropical waters, bountiful resources, and appealing natural environment were among the many fine qualities that attracted visitors to the Keys. However, warning signs that the Keys' environment and natural resources were fragile, and not infinite, came early. In 1957, a group of conservationists and scientists held a conference at the Everglades National Park and discussed the demise of the coral reef resources in the Keys at the hands of those attracted there because of their beauty and uniqueness. This conference resulted in action that created the world's first underwater park, the John Pennekamp Coral Reef State Park in 1960. However, in just a little over a decade following the establishment of the park, a public outcry was sounded that cited pollution, overharvest, physical impacts, overuse, and use conflicts as continuing to occur in the Keys. These concerns continued to be voiced by environmentalists and scientists alike throughout the decade of the 1970's and indeed, into the 1990's.

Other management efforts were instituted to protect the coral reefs of the Florida Keys. The Key Largo National Marine Sanctuary was established in 1975 to protect 103 square nautical miles of coral reef habitat stretching along the reef tract from north of Carysfort Lighthouse to south of Molasses Reef, offshore of the Upper Keys. In 1981, the 5.32 square nautical mile Looe Key National Marine Sanctuary was established to protect the very popular Looe Key Reef located off Big Pine Key in the Lower Keys. Throughout the 80's mounting threats to the health and ecological future of the coral reef ecosystem in the Florida Keys prompted Congress to take action to protect this fragile natural resource. The threat of oil drilling in the mid to late 1980's off the Florida Keys, combined with reports of deteriorating water quality throughout the region, occurred at the same time scientists were assessing the adverse affects of coral bleaching, the die-off of the long-spined urchin, loss of living coral cover on reefs, a major seagrass die-off, declines in reef fish populations, and the

spread of coral diseases. With the reauthorization of the National Marine Sanctuary Program in 1988, Congress directed the Sanctuary Program to conduct a feasibility study of possible expansion of Sanctuary sites in the Keys. Those study sites were in the vicinity of Alligator Reef, Sombbrero Key, and westward from American Shoals. This endorsement for expansion of the Sanctuary program in the Keys was a Congressional signal that the health of the resources of the Florida Keys was of National concern. The feasibility study was overtaken by several natural events and ship groundings that precipitated the designation of the Florida Keys National Marine Sanctuary.

Three large ships ran aground on the coral reef tract within a brief 18 day period in the fall of 1989. Coincidental as it may seem, it was this final physical insult to the reef that prompted Congress to take action to protect the coral reef ecosystem of the Florida Keys. Although most remember the ship groundings as having triggered Congressional action, it was in fact the cumulative events of environmental degradation, in conjunction with the physical impacts that prompted Congressman Dante Fascell to introduce a bill into the House of Representatives in November of 1989. Congressman Fascell had long been an environmental supporter of South Florida and his action was very timely. The bill was sponsored in the Senate by Senator Bob Graham, also known for his support of environmental issues both in Washington, and as a Florida Governor. It was passed by Congress through bi-partisan support and was signed. On November 16, 1990, President George Bush signed into law the Florida Keys National Marine Sanctuary and Protection Act (FKNMSPA) (Appendix A in Volume III).

**Florida Keys Environmental Setting.** The Florida Keys National Marine Sanctuary extends approximately 220 miles southwest from the southern tip of the Florida peninsula. Located adjacent to the Keys' land mass are spectacular, unique, and nationally significant marine environments, including seagrass meadows, mangrove islands, and extensive living coral reefs. These support rich biological communities possessing extensive conservation, recreational, commercial, ecological, historical, research, educational, and aesthetic values that give this area special national significance. They are the marine equivalent of tropical rain forests, in that they support high levels of biological diversity, are fragile and easily susceptible to damage from human activities, and possess high value to humans if properly conserved.

The marine environment of the Florida Keys supports over 6,000 species of plants, fishes, and invertebrates, including the Nation's only coral reef that lies adjacent to the continent, and one of the largest seagrass communities in this hemisphere. Attracted by this natural diversity and tropical climate, approximately four million tourists visit the Keys annually, where they participate primarily in water-related sports such as fishing, diving, boating, and other activities.

**Sanctuary Boundary.** The Act designated 2,800 square nautical miles of coastal waters off the Florida Keys as the Florida Keys National Marine Sanctuary. The Sanctuary boundary extends southward on the Atlantic Ocean side of the Keys from the north easternmost point of the Biscayne National Park along the approximate 300-foot isobath for over 200 nautical miles to the Dry Tortugas. From there it turns north and east, encompassing a large portion of the Gulf of Mexico and Florida Bay, where it adjoins the Everglades National Park. The landward boundary is the mean high water mark. The Key Largo and Looe Key National Marine Sanctuaries, the State Parks and Aquatic Preserves, and the Florida Keys Refuges of the U.S. Fish and Wildlife Service are overlapped by the Sanctuary; whereas the Everglades National Park, Biscayne National Park, and Dry Tortugas National Park are excluded from the boundary of the Sanctuary.

**Threats to the Environment.** The deterioration of the marine environment in the Keys is no longer a matter of debate. There is a decline of healthy corals, an invasion by algae into seagrass beds and reefs, a decline in certain fisheries, an increase of coral diseases and coral bleaching. In Florida Bay, reduced freshwater flow has resulted in an increase in plankton blooms, sponge and seagrass die-offs, and fish kills.

Over four million people visit the Keys annually, 70% of whom visit the Sanctuary. Over 80,000 people reside in the Keys full time. Since 1965, the number of registered private recreational vessels has increased over six times. There are significant direct and indirect effects from the high levels of use of Sanctuary resources resulting from residents and tourists. The damage done by people hinders the ability of marine life to recover from naturally occurring stresses. Human impacts can be separated into direct and indirect impacts.

**Direct human impacts.** The most visible and familiar physical damage results from the carelessness or, on

occasion, the recklessness of ship captains, boaters, divers, fishermen, snorkelers and beachgoers. Over 30,000 acres of seagrasses have been damaged by boat propellers. Direct impacts to resources also result from careless divers and snorkelers standing on coral, improperly placed anchors, and destructive fishing methods. In the period between 1993 and 1994, approximately 500 vessels were reported aground in the Sanctuary. These groundings have a cumulative effect on the resources. Over 19 acres of coral reef habitat has been damaged or destroyed by large ship groundings.

**Indirect human impacts.** The overnutrification of nearshore waters is a documented problem in the Sanctuary. A major source of excess nutrients is sewage-25,000 septic tanks, 7,000 cesspools, 700 shallow injection wells, and 139 marinas harboring over 15,000 boats. These nutrients are carried through the region by more than 700 canals and channels. Removing nitrogen and phosphorous from wastewater requires a technology that, at present, is lacking from sewage treatment facilities in the Keys.

### Management Plan Requirements

The FKNMSPA directs the Secretary of Commerce to develop a comprehensive management plan and implement regulations to protect Sanctuary resources. The Act requires that the plan:

- facilitate all public and private uses of the Sanctuary consistent with the primary objective of resource protection;
- consider temporal and geographic zoning to ensure protection of Sanctuary resources;
- incorporate the regulations necessary to enforce the comprehensive water quality protection program developed under Section 8 of the FKNMSPA;
- identify needs for research, and establish a long-term ecological monitoring program;
- identify alternative sources of funding needed to fully implement the Plan's provisions and supplement appropriations authorized under Section 10 (16 U.S.C., §1444) of the FKNMSPA and Section 313 of the NMSA;
- ensure coordination and cooperation between Sanctuary managers and other Federal, State,

## General Introduction

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and local authorities with jurisdiction within or adjacent to the Sanctuary;

- promote education among users of the Sanctuary about coral reef conservation and navigational safety; and
- incorporate the existing Looe Key and Key Largo national marine sanctuaries into the Florida Keys National Marine Sanctuary.

All of these requirements have been addressed in the Management Plan.

In addition to the above statutory objectives, the Sanctuary Advisory Council, early on in the planning process in 1992, developed a set of goals and objectives for the Sanctuary that NOAA later adopted. The goal is:

"To preserve and protect the physical and biological components of the South Florida estuarine and marine ecosystem to ensure its viability for the use and enjoyment of present and future generations."

The objectives include:

- Encouraging all agencies and institutions to adopt an ecosystem and cooperative approach to accomplish the following objectives, including the provision of mechanisms to address impacts affecting Sanctuary resources but originating outside the boundaries of the Sanctuary;
- Providing a management system which is in harmony with an environment whose long-term ecological, economic, and sociological principles are understood, and which will allow appropriate sustainable uses;
- Managing the Florida Keys National Marine Sanctuary for the natural diversity of healthy species, populations, and communities;
- Reaching every single user and visitor to the FKNMS with information appropriate to their activities; and
- Recognizing the importance of cultural and historical resources, and managing these resources for reasonable, appropriate use and enjoyment.

NOAA incorporated the Sanctuary Advisory Council's objectives into the Final Comprehensive Manage-

ment Plan, and some progress has already been made toward accomplishing these objectives. For example, steps have been taken to meet the first objective of ecosystem management. Sanctuary Staff have been involved in the efforts of the South Florida Ecosystem Restoration Task Force and the Governor's Commission for a Sustainable South Florida. These two efforts have focused on the restoration of the South Florida ecosystem, of which the Sanctuary is the downstream component. These combined efforts recognize the importance of protecting and preserving the natural environment for the sustainable use of future generations. The natural and built environments have to be managed in harmony to sustain the healthy environment upon which South Florida economy is dependent upon.

### Overview of the Planning Process

The size of the Sanctuary and the diversity of its users required that NOAA adopt a holistic, ecosystem-based management approach to address the problems facing the Sanctuary. This meant using a problem-driven focus, relying on partnerships, and building consensus around the identification of issues and their short- and long-term solutions.

**A Comprehensive Approach.** The FKNMSPA requires NOAA to develop a comprehensive management plan. To meet this mandate, NOAA has addressed many problems and issues, such as water quality and land use, that are outside the "traditional" scope of Sanctuary management. The process involved unprecedented participation by the general public, user groups, and Federal, State, and local governments.

Because of the size of the Sanctuary and the variety of resources it contains, many problems never before encountered by Sanctuary management had to be addressed. For example, significant declines in water quality and habitat conditions in Florida Bay are threatening the health of Sanctuary resources. These conditions are thought to be the result of water quality and quantity management in the South Florida region. Such problems must be addressed by management to ensure adequate protection of Sanctuary resources. There is a need, therefore, to explicitly include the agencies with responsibilities in these areas in an ecosystem management approach.

**Knowledge-based Consensus Building.** A series of workshops followed a set of public scoping meetings, and laid the foundation for building this Plan. At



these work sessions, NOAA used a systematic process for obtaining relevant information from experts with knowledge of Sanctuary problems.

NOAA recognized that a useful management plan could not be developed and implemented without forging working teams to help provide the vision and knowledge necessary to accomplish the goals set forth in the FKNMSPA. Four teams were formed to ensure that input was provided by major Federal, State, and local interests in the Sanctuary, and to see that a plan was produced that met the goals and objectives set forth by the FKNMSPA and NOAA. There was considerable interaction, and some overlap in membership and function, among these teams.

- In July 1991, the Interagency Core Group, composed of Federal, State, and local agencies with direct jurisdictional responsibility in the Sanctuary, was formed to develop policies, and direct and oversee the management plan development process (Appendix B in Volume III lists the members of this Core Group).
- Sanctuary Planners held a series of workshops, from July 1991 through January 1992, which focused on a range of topics. The workshop topics included mooring buoys, education, photobathymetry, research, submerged cultural resources, and zoning.
- A Strategy Identification Work Group, composed of 49 local scientists and management experts, generated the initial set of strategies and details on implementation requirements.
- The Sanctuary Advisory Council (SAC) was established by the FKNMSPA to ensure public input into the Plan, and to advise and assist NOAA in its development and implementation. The SAC first met in February 1992 and conducted over 30 meetings that were open to the public (Appendix B in Volume III contains a list of SAC members). The SAC became an integral part of the Sanctuary planning process by serving as a direct link to the Keys' user communities, such as the dive industry, environmental groups, and commercial and recreational fishermen. In addition, the SAC has been instrumental in helping NOAA formulate policy, particularly with regard to: 1) the marine zoning plan, 2) activities needing regulation, and 3) recommending a preferred alternative for the Management Plan.

- A NOAA team composed of the Sanctuaries and Reserves Division, the Strategic Environmental Assessments Division, and the Office of the Assistant General Counsel for Ocean Services was responsible for developing and implementing the process to produce the Draft Plan. The Sanctuaries and Reserves Division is responsible for coordinating the review and producing the Final Management Plan and Environmental Impact Statement.

**Focus on Management and Action.** From the beginning of the Plan development process, it has been recognized that management is a continuous activity that must involve those responsible for implementing actions. The process has made maximum use of existing knowledge and experience to identify, characterize, and assess alternative management actions. Much of the planning process was devoted to identifying short- and long-term management actions or strategies, including their operational requirements. These management actions can be found in the detailed action plans contained in this volume. These plans address management issues ranging from channel marking, to volunteer programs, to regulations. They provide details on institutional needs, personnel, time requirements, and implementation costs. These details are necessary for the decisions that will have to be made upon Plan implementation by the managers in the region.

**Toward Integrated, Continuous Management.** A central purpose of the Management Plan is to take the disparate threads of protection and regulation that currently apply to the Florida Keys' ecosystem and weave them into a fabric of integrated coastal management (ICM). ICM is not a new idea or concept; what is new is the notion of applying it in a comprehensive and continuous manner. ICM is a process that begins with direct participation of managers, planners, analysts, scientists, and a concerned public. Developing an integrated management approach does not take place quickly; it evolves over time, based on incremental gains that build upon one another.

A major component of the Management Plan is the consideration of water quality issues and problems. The FKNMSPA called upon the U.S. Environmental Protection Agency and the State of Florida to develop a comprehensive water quality protection program for the Sanctuary. NOAA has incorporated this protection program into the Management Plan as the Water Quality Action Plan found in this volume.

## Overview of the Public Review Process

The Draft Management Plan and Environmental Impact Statement (DMP/EIS) for the Florida Keys National Marine Sanctuary was released to the public at a Sanctuary Advisory Council meeting on April 4, 1995. This initiated a nine-month public review of the draft plan that ended December 31, 1995. During this review period, Sanctuary staff facilitated the public's review of the plan in a variety of ways that were designed to maximize the public's full understanding of the components and contents of the draft plan.

The nine month public review process included the following opportunities:

- *Sanctuary Advisory Council Preview.* On April 4, the draft plan was released in a public meeting. At this meeting, each of the authors of the Action Plans contained in the Preferred Alternative (Volume I) gave a verbal summary of the contents of the Action Plans. This day-long, detailed preview, initiated the public's review of the draft plan and served to introduce and familiarize the public with the plan.
- *Info-Expos.* The Sanctuary staff held two series of three-day-long Info-Expos in April and May of 1995 and October 1995. The Info-Expos were held in the Upper, Middle, and Lower Keys. They were set up like a trade show and individual tables served as information booths manned by Sanctuary staff, Sanctuary Advisory Council members, Core Group members, and a Spanish interpreter. The Info-Expo staff passed out materials and answered the public's questions about the draft plan. Each of the booths represented a specific theme such as water quality, fishing, boating, zoning, etc. Additionally, staff distributed copies of the draft plan to the public if they had not received one by mail.
- *Working Groups.* In June 1995, the Sanctuary Advisory Council established 10 Working Groups, one for each action plan, to assist in the public review of the draft plan. The SAC appointed a Chairperson for each of the Working Groups and other SAC members were encouraged to sign up to participate in the Working Groups that they were interested in monitoring.

In August 1995, the Sanctuary Staff gave the Working Groups a briefing outlining the purpose, objectives, and ground rules for the Working Group's public review of the draft plan. The purpose of the Working Groups was to broaden the public's review of the draft plan in order to get the best and most comprehensive review possible. An objective of the process was to help the SAC formulate their comments on the draft plan. The ground rules were: that membership on the Working Groups was open and the public was encouraged to sign up and participate; no voting (strive for consensus, but record both sides when split); all suggestions were to be recorded; the Working Group meetings were to be held in different parts of the Keys; and Sanctuary staff were to serve in a support role.

Each of the Working Groups held multiple meetings in various parts of the Keys. The public was given enormous opportunity to provide their input on the draft plan.

- *Public Hearings.* There were six public hearings held on the draft plan. The hearings were held in Miami, Key Largo, Marathon, Key West, St. Petersburg, and Silver Spring, Maryland. The Sanctuary Advisory Council was encouraged to attend as many of the meetings as possible in order to help the SAC further develop their comments on the draft plan. This made it possible for the SAC to take full advantage of the public's comments in their deliberations on the draft plan in November and December.

As a result of the public review process, NOAA received over 6,400 statements of public comment on the draft management plan and environmental impact statement. Clearly, the use of the Sanctuary Advisory Council Working Groups assisted the advisory council in the development of their comments on the draft plan. As a result of their review process, the input at public hearings, and written public comments, NOAA has been able to develop a Final Management Plan that reflects a broad range of public comments.

## The Environmental Impact Statement Process

The National Environmental Policy Act of 1969 (NEPA) requires any Federal agency proposing a major action that significantly affects the quality of the human environment to develop an environmental impact statement that describes both the positive and negative impacts that may result from implementation. Accordingly, an EIS has been drafted to accompany the Management Plan, and both have gone through a public review and comment process prior to adoption in this Final Plan. The Draft EIS evaluated a range of reasonable alternative approaches to Sanctuary management. These alternatives are presented in Volume II to facilitate analysis of their effects. The Preferred Alternative for Sanctuary management is presented based on NOAA's analysis of its impacts and the public comments.

## Contents of Volume I

This volume includes a summary of the Preferred Alternative, and a discussion of the final management plan. It consists of the following chapters: 1) the Preferred Alternative/Management Plan; and 2) Action Plans. Brief descriptions of these chapters follow.

**The Preferred Alternative/Management Plan.** This chapter includes a summary of the Preferred Alternative, and a discussion of the Final Management Plan. This is followed by a discussion of Plan implementation under the "continuous management process." The administrative framework for management, and a review of potential alternative funding sources, are also part of this chapter.

**Action Plans.** This chapter includes complete discussion of 10 action plans that provide the operational details for implementing the Management Plan. Each action plan is composed of a bundle of strategies sharing common management objectives, and presents the initial outline of the steps required for plan implementation. More specifically, the action plans provide an organized structure and process for implementing management strategies, including a description of the activities required, institutions involved, and requirements necessary for either complete or partial implementation.

**The Research and Monitoring and Water Quality** action plans each address requirements mandated in the FKNMSPA. Education and volunteer programs have been established to make the public a participant in protecting Sanctuary resources. The Enforcement, Channel/Reef Marking, Mooring Buoy, Submerged Cultural Resources, and Zoning action plans outline specific actions that will be taken to protect Sanctuary resources. The Regulatory Action Plan includes the regulations for the Sanctuary, and explains how management strategies have been incorporated into these regulations.

# The Preferred Alternative/Management Plan

## Introduction

The National Marine Sanctuaries Act (NMSA) and the Florida Keys National Marine Sanctuary and Protection Act of 1990 (FKNMSPA) mandate the development of a comprehensive management plan that protects Sanctuary resources and facilitates Sanctuary uses that are compatible with the primary objective of resource protection. The management plan was developed consistent with the planning guidelines in the National Environmental Policy Act (NEPA). The environmental and socioeconomic consequences of various alternatives have been taken into consideration in developing the final comprehensive management plan for the Sanctuary. The Draft Preferred Alternative was described in Volume II of the DMP/EIS and was the focus of a nine month public review from April 4, 1995 through December 31, 1995. This section sets forth the Final Preferred Alternative, and the way in which it was developed, through consideration of the public comments, of the FKNMSPA, and of NEPA.

The environment and the economy of South Florida and the Florida Keys are directly linked. The nearly \$2 billion dollar economy of the region is dependent on a healthy environment and without a healthy environment the economy would surely decline. For example, in the Florida Keys the non-market user value of water-based recreational activity was estimated in 1990 to be worth about \$660 million per year to both the residents and tourists (Leeworthy et al. 1993). That value has continued to increase. Clearly, if the health of the environment in the Florida Keys continues to decline as has been identified in Florida Bay and along the coral reef tract, the economy of South Florida and specifically the Florida Keys will be adversely affected.

In the development of the DMP/EIS, NOAA took into consideration the consequences of not taking any management actions to protect the fragile natural environment of the Florida Keys versus establishing extremely conservative and protective measures that would protect the natural resources of the Florida Keys regardless of the economic impacts on the area. Clearly recognizing the direct ties between the environment and the economy of the Keys, NOAA has balanced these interests in the development of the management plan for the Sanctuary. This task has not been easy because of the wide range of competing and conflicting interests. Many of the

more than four million visitors annually come here to just look, others come because it is the sport fishing capital of the world, or its the place you can drive to and dive a tropical coral reef and still be in the continental U.S. One commentor at the public hearings said he "has the same right to look at a grouper as the next guy has to spear it." That point was even more clear when another commentor pointed out that "many people can photograph a fish, while only one can spear it."

The trends of increasing population and visitors adding pressures on the resources of the Florida Keys continue to grow. Nobody can deny or dispute that fact. The Final Management Plan and Environmental Impact Statement (FMP/EIS) provides a balanced approach to managing the resources of the Florida Keys by identifying ways of keeping the pulse of the health of the environment and communicating those conditions to the public, while creating ways the public can continue to use and enjoy the Keys environment with the least amount of impact. Conditions are changing rapidly in South Florida and the Florida Keys, and we must be prepared.

During the lengthy public review process for the DMP/EIS, NOAA received over 6,414 written and verbal comments on the draft plan and has given those comments full consideration in developing the FMP/EIS. In addition, the Sanctuary Advisory Council commented on the draft plan. Those comments have been given considerable weight in the development of the Final Plan.

## Development of the Management Alternatives

The environmental impacts of the alternatives, including the Preferred Alternative for the MP/EIS, are described in Volume II (pages 136-156). Through scoping meetings, workshops, and other public processes, NOAA narrowed the scope in the Draft EIS to five management alternatives ranging from I-V, and eliminated I and V early in the evaluation process because they would not adequately achieve the environmental and economic requirements of the NMSA and FKNMSPA, and other applicable Federal, State, and local laws.

Alternative I, the most restrictive, focused solely on resource protection, and would not allow for compatible uses of the Sanctuary. While it would have

## *The Preferred Alternative/Management Plan*

positive environmental impacts, Alternative I would have significant negative and unacceptable socioeconomic impacts, such as virtually closing down commercial and recreational fishing and prohibiting many other recreational uses.

Alternative V (no action), the least restrictive, would have negative environmental and socioeconomic impacts over the long term, and would not accomplish the resource protection goals of the NMSA and the FKNMSPA. Without the implementation of a management plan, continued environmental degradation would occur, which ultimately would lead to significant losses of revenue, jobs, and investments in the marine-based tourism, recreation, and commercial fishing industries of the Florida Keys. These impacts are not consistent with the FKNMSPA goal of resource protection and facilitation of compatible, multiple Sanctuary uses.

After considering the environmental and socioeconomic impacts of the three mid-range (Alternatives II-IV) management alternatives in the draft plan, NOAA proposed for public comment Alternative III as the Preferred Management Alternative to achieve the proper balance of resource protection and facilitation of compatible uses. The process used to select the Preferred Alternative included considering recommendations of the Sanctuary Advisory Council, the Interagency Core Group, and the public. It involved careful examination of the relative impacts of each alternative on the region's natural resources and human activities.

NOAA has revised the Preferred Alternative based on the public and agency comments received during the nine month review process. Therefore, this section of the management plan describes the Final Preferred Alternative for managing the Sanctuary and the environmental and socioeconomic consequences taken into consideration in the selection process.

### **Final Plan for Sanctuary Management**

The Final Management Plan contained in this volume includes 10 Action Plans addressing management strategies developed from the planning process and the public's review of the DMP/EIS. These strategies are listed by Action Plan in Table 1. These strategies are the most balanced approach to meeting the goals of the laws establishing the Florida Keys National Marine Sanctuary (FKNMS). They provide potential solutions to known problems, and should

prevent new problems from arising. While NOAA is charged with producing a "comprehensive" plan to manage the Sanctuary, the plan sets forth high, medium, and low priority levels for strategies, and only a subset of the proposed actions can be implemented in the near future. The mechanisms which will be used to apply these strategies, and the process used to identify strategies to be applied in the future, are described in the Action Plans contained in this volume.

Descriptions of the strategies used to develop the Action Plans and Alternatives are located in Appendix H of Volume III. These strategies were evaluated and scrutinized throughout the development of the Management Plan. Many were modified to reflect concerns and issues that were not evident when the process began (e.g., Florida Bay water quality problems). Some strategies were changed to address specific problems that were raised by the public at Advisory Council meetings, while others have remained essentially the same as drafted at the Strategy Assessment Workshop held in February 1992. Upon consideration of the public comments on the DMP/EIS, further changes were made, resulting in the Final Management Plan.

The actions in this Final Plan represent the efforts of many groups and individuals. While NOAA is responsible for developing the Management Plan, it has treated the process for its development as a partnership with the State of Florida, and has also sought the participation of other Federal agencies, local government agencies, non-governmental organizations, resource users, and the public. All of these parties have contributed to the content of this Plan.

Appendix L contains the record of significant public comment on the DMP/EIS. Although public comment on the draft plan was abundant and came from diverse sources, the issues and specific areas of concern were fairly narrow and focused in scope. The summary of comments and responses in Appendix L sets forth the significant concerns and explains how they are addressed in the Final Plan. The action plans that received the most abundant comment, resulting in the most revisions were: the education and outreach, regulatory, research and monitoring, submerged cultural resources, water quality, and zoning plans.

The issues that received the majority of public comment were: the operation of personal watercraft; marine zoning; certain proposed regulations; water quality; Sanctuary authority; and the draft Designation Document (Appendix K), containing a draft

Table 1. Management Strategies by Action Plan

Channel/Reef Marking			
B.1 Boat Access			
B.4 Channel/Reef Marking			
Education			
E.1 Printed Materials	E.4 Training/Workshops/Schools	E.7 Promotional/Educational Materials	E.12 Professional Development
E.2 Audio-Visual Materials	E.5 PSAs	E.10 Public Forum	
E.3 Signs/Displays/Exhibits	E.6 Advisory Board	E.11 Special Events	
Enforcement			
B. 6 Additional Enforcement			
B.12 Cross-deputization			
Mooring Buoy			
B.1 Boat Access		B.15 Mooring Buoy Management	
Regulatory			
B.4 Channel/Reef Marking	F.1 Consistent Fishing Regulations	L.14 Dredging Prohibition	Z.1 Wildlife Management Zones
B.7 Pollution Discharges	F.4 Aquaculture Alternatives	L.15 Dredging Regulation	Z.2 Ecological Reserves
B.11 Special-use Permits	F.7 Artificial Reefs	R.1 SCR Management	Z.3 Sanctuary Preservation Areas
B.13 Salvaging/Towing	F.8 Exotic Species	R.7 Coral Touching	Z.4 Existing Management Areas
B.17 Vessel Operations/ PWC Management	F.11 Gear/Method Impacts		Z.5 Special-use Areas
	F.14 Spearfishing		
Research and Monitoring			
B.2 Habitat Restoration	F.10 Bycatch	W.18 Pesticide Research	W.32 Technical Advisory Committee
B.11 National Marine Sanctuary Permits	F.11 Gear/Method Impacts	W.20 Monitoring	W.33 Ecological Monitoring
F.3 Stocking	F.14 Spearfishing	W.21 Predictive Models	Z.2 Ecological Reserves
F.4 Aquaculture Alternatives	F.15 Sponge Harvest	W.24 Florida Bay Influence	Z.3 Sanctuary Preservation Areas
F.6 Fisheries Sampling	R.5 Carrying Capacity	W.28 Regional Database	Z.5 Special-use Areas
F.7 Artificial Reefs	W.5 Water Quality Standards	W.29 Dissemination of Findings	
Submerged Cultural Resources			
R.1 SCR Management			
Volunteer			
B.1 Boat Access	E.1 Printed Materials	E.10 Public Forum	R.2 Recreation Survey
B.2 Habitat Restoration	E.2 Audio-Visual Materials	E.11 Special Events	W.20 WQ Monitoring
B.3 Derelict Vessels	E.3 Signs/Displays/Exhibits	F.7 Artificial Reefs	W.33 Ecological Monitoring
B.4 Channel/Reef Marking	E.4 Training/Workshops/Schools	F.9 Gear Removal	
B.9 Visitor Registration	E.5 PSAs	F.11 Gear/Method Impacts	
B.10 Damage Assessment	E.7 Promotional/Educational Materials	R.1 SCR Management	
Water Quality			
B.7 Pollution Discharges	W.4 Wastewater Disposal, Key West	W.15 HAZMAT Response	W.28 Regional Database
E.4 Training/Workshops/Schools	W.5 Water Quality Standards	W.16 Spill Reporting	W.29 Dissemination of Findings
L.1 Marina Pumpout	W.6 NPDES Program Delegation	W.17 Mosquito Spraying	W.32 Technical Advisory Committee
L.2 Marina Siting & Design	W.7 Res. Monitoring of Sfc. Discharge	W.18 Pesticide Research	W.33 Ecological Monitoring
L.3 Marina Operations	W.8 OSDS Permitting	W.19 Florida Bay Freshwater Flow	Z.5 Special-use Areas
L.6 Mobile Pumpout	W.9 Laboratory Facilities	W.20 Monitoring	
L.7 SWD Problem Sites	W.10 Canal WQ	W.21 Predictive Models	
L.10 HAZMAT Handling	W.11 Stormwater Retrofitting	W.22 Wastewater Pollutants	
W.1 OSDS Demonstration Project	W.12 Stormwater Permitting	W.23 Special Studies	
W.2 AWT Demonstration Project	W.13 Stormwater Management	W.24 Florida Bay Influence	
W.3 Wastewater Mangmt. Systems	W.14 Best Management Practices		
Zoning			
Z.1 Wildlife Management Areas	Z.3 Sanctuary Preservation Areas	Z.5 Special-use Areas	
Z.2 Ecological Reserves	Z.4 Existing Management Areas		
No Plan			
B.8 User Fees	L.8 Containment Options	L.18 Wetland Dredge and Fill	W.31 Global Change
B.10 Dock Permitting	L.9 SWD Policy Compliance	L.19 Growth Impacts	
F.5 Limited Entry	L.11 HAZMAT License	L.20 Public Access	
F.12 Finfish Traps	L.12 HAZMAT Collection	W.25 WQ Impact Research	
L.4 RV Pumpout	L.16 Water-use Reduction	W.26 Indicators	
L.5 RV Waste Reduction	L.17 Dredge and Fill Authority	W.27 Other Monitoring Tools	

Abbreviations: Mangmt., Management; Res., Resource; Sfc. Surface.

Note: Strategies may appear in more than one action plan.

## *The Preferred Alternative/Management Plan*

scope of potential regulations. For example, of the 6,400 written comments received on the draft plan, over 50% addressed the operation of personal watercraft within the Sanctuary. Another 10% of the comments addressed the proposed Key Largo Replenishment Reserve in the draft marine zoning plan contained in the DMP/EIS.

The final preferred alternative reflects changes based on public comment and the recommendations from the Sanctuary Advisory Council and therefore differs from the draft preferred alternative. The significant differences in each of the 10 action plans are described below as well as their environmental and socioeconomic impacts. The most significant changes occur in the regulatory, zoning, and submerged cultural resources action plans with additional changes occurring in the rest of the action plans.

### **Summary by Action Plans**

#### **Channel/Reef Marking Action Plan**

The Channel/Reef Marking Action Plan establishes an important management tool to identify areas that need channel markers and reef warning markers, and a process to select, install and maintain an effective channel/reef marking system for boaters Sanctuary-wide. It is well known that wide scale damage to shallow water marine resources, particularly seagrass beds and coral reefs, has occurred throughout the Florida Keys due to careless operation of vessels. Thousands of acres of seagrass have been impacted by propeller scars and significant coral reef formations have been destroyed from direct contact by vessels. Analysis of the patterns of shallow water marine resource damage indicates that in many cases, these injuries could have been avoided through the appropriate placement of channel or reef warning markers to indicate the best route through shallow, sensitive areas.

This action plan identifies background data and analysis necessary to identify areas that would benefit from channel/reef marking, establishes the criteria that will be used in determining priorities of new channel/reef markers, creates a mechanism to recommend and install new channel/reef markers and evaluates the effectiveness or potential impact of channel marking projects. Much of the data and analysis component of the action plan has already been completed. The primary mechanism for the implementation of the activities identified in this action plan is the creation of a Channel/Reef Marking

Working Group (CMWG), comprised of representatives from each of the major governmental entities involved with channel/reef marking as well as representatives of affected citizen and user groups.

The goal of additional channel/reef marking in well-defined and prioritized locations is to reduce the damage to shallow-water resources. However, careful monitoring must be carried out to evaluate the effectiveness of the Channel/Reef marking program to insure that the markers are having the desired result. Markers that are found to increase shallow-water resource damage by attracting additional boating activity will be removed.

The installation of a channel/reef marking system will have very positive environmental benefits by protecting the seagrass communities which serve as important nursery areas for significant recreational and commercial species of fish and shellfish. This action plan will also have a very positive socioeconomic benefit in that it will provide protection to some of the most significant resources of the Sanctuary that are necessary to support the recreational and commercial interests of the Keys. A Channel/Reef Marking Program will reduce the incidence of vessel groundings which should have a positive economic impact on boaters since significant costs associated with damage to private vessels will be avoided. The plan may have a slight negative economic impact on the towing/salvage industry due to the anticipated reduction in the number of vessel groundings, but an overall positive socioeconomic benefit to the area by protecting the marine resources from the type of impact.

#### **Education and Outreach Action Plan**

One of the primary mandates of the Florida Keys National Marine Sanctuary and Protection Act is to educate the public about the marine environment surrounding the Keys. The diverse habitats, resources, and unique setting of the Keys offers opportunities for the interpretation of marine subtropical and temperate environments. Education and outreach efforts are extremely important resource protection tools. By fostering a sense of stewardship, resource managers can involve the public in reaching the goal of a sustained and healthy environment.

The goal of the Education and Outreach Action Plan is to protect marine resources by promoting a holistic view of the Keys' ecosystem as an interrelated and interdependent system of habitats, and by encouraging and promoting a sense of stewardship regarding

the marine environment. By implementing these strategies adverse impacts on Sanctuary resources will be reduced.

Changes to this action plan included a name change: outreach was added. Commentors recognized the importance of public outreach in an area where there is such heavy use of the resources by local residents and by vast numbers of tourists. Clearly, the education of the general public and user groups that must be reached in a very short time frame calls for the use of outreach strategies. In addition, a number of suggestions coming from the local education community have been integrated to better address learner outcome goals. Some comments suggested that products developed through this plan be multi-lingual when necessary and appropriate.

Other comments included increasing the priority of establishing a Sanctuary Advisory Board and the need for utilizing the existing network of educators and environmental education organizations and institutions already in place. NOAA has revised the document to reflect these comments.

The benefits of the Education and Outreach Action Plan are enormous. Fostering a sense of stewardship in a global community benefits all aspects of resource management, because an informed public is less likely to inflict negative impacts on the marine resources. Costs incurred for educational and outreach needs are nominal in the light of the exponential benefits of a skilled and knowledgeable public.

### **Enforcement Action Plan**

Since 1980, the Sanctuary Enforcement Program in Florida has operated under a cooperative agreement with the State. In addition to enforcing local and state laws, Sanctuary enforcement officers possess the authority to enforce the National Marine Sanctuaries Act and other NOAA statutes that apply within the sanctuary. The State/Federal agreement on enforcement can be found in Appendix J of Volume III.

The goals of the Enforcement Action Plan are: (1) to protect sanctuary resources by increasing the public's understanding of the importance of sanctuary regulations, achieving voluntary compliance; and (2) promote public stewardship of the marine resources through interpretive enforcement.

Enforcement officers apply an "interpretive enforcement" strategy when patrolling waters or speaking to citizens. This approach seeks voluntary compliance

with sanctuary regulations by educating users about regulations, why they should comply, and how they can comply. Reaching out to the sanctuary community through educational messages and literature reduces the number of violations, and fosters a sense of stewardship among Sanctuary users.

Changes to the Enforcement Action Plan were made in response to comments received. General comments were also received which stated that NOAA would never be able to fund the number of enforcement officers necessary and thus funding should be geared more toward education. NOAA agrees that enforcement of existing and new regulations will be both a physical and fiscal challenge. In order to protect the natural resources and look after the safety of the visitors and themselves, it is expensive to put uniformed officers on the water with all the equipment they are required to have to accomplish their jobs. These limitations serve as good reminders as to why it is important to maximize on coordinating all the marine protection efforts of enforcement agencies in the Keys. This coordination and sharing of human and material resources will have a positive environmental benefit in that there will be better coordinated efforts directed at resource protection. An example is the status of the current enforcement program for the Sanctuary where the Sanctuary Officers are FDEP Florida Marine Patrol Officers that are cross-deputized to enforce both State and Federal regulations. This arrangement has saved on creating duplicate communications systems, training, administrative costs, etc. and has resulted in a cost savings to the public. There will also be other very positive socioeconomic benefits that will come from sharing of costly material resources between agencies rather than the continued purchase or replacement of these resources.

NOAA also agrees that it is important to invest financial resources into education as a critical component of the enforcement program. That is specifically why National Marine Sanctuaries rely heavily on all the various management programs such as those outlined in this management plan to achieve its goals. NOAA will continue to use an educational and interpretive approach to enforcement to protect the resources of the Sanctuary, as it has at Key Largo NMS for 20 years and Looe Key NMS for 15 years.

No less than eight different enforcement agencies have jurisdiction within the Sanctuary. The Enforcement Action Plan calls for expanded coordination among all these agencies through an enforcement task force and more comprehensive protection



through cross-deputization of the various agencies to support one another in resource protection. The direct benefits include improved resource protection, greater public support, and savings to the taxpayers.

### **Mooring Buoy Action Plan**

Mooring buoys have been shown to be an effective management tool to minimize the damage to coral reefs and other sensitive marine resources resulting from careless and/or inappropriate anchoring practices. However, concerns have been raised recently that the improper use of mooring buoys may have the potential to negatively impact marine resources by attracting more boaters, divers, and fishermen than would have previously used the areas where they are placed. This plan will establish a methodology for identifying areas appropriate for locating mooring buoys and managing boating activities near coral reefs so that the negative impacts will be minimized.

In response to numerous public comments the third of three mooring buoy strategies (R.5: Carrying Capacity) has been deleted from the Mooring Buoy Action Plan. Although many commentators wrote about their concerns that the Keys had exceeded their carrying capacity for a healthy environment, others felt that mooring buoys were not necessarily the mechanism for limiting impacts until further research is complete. NOAA has agreed, and consistent with the SAC recommendations has moved the Carrying Capacity strategy into the Research and Monitoring Action Plan. There the impacts from use of the resources versus the changes due to water quality and environmental changes can be identified and addressed.

Mooring buoys are one of the most basic and cost effective mechanisms for reducing physical impacts in sensitive areas. Beginning in the early 1980's NOAA began installing mooring buoys on coral reefs to prevent anchor damage. This has had a very positive environmental benefit in that mooring buoys provide direct protection to living corals from the impact of anchors. The designation of the FKNMS is partially the result of Congress' recognition of the vulnerability of the coral reefs to direct impacts from human use such as anchor damage. The environmental benefits will be high, and the socioeconomic benefits will be positive, in that mooring buoys will prevent the continued degradation reefs are receiving from more and more boat anchors.

The amount of protection that corals receive from the use of mooring buoys far outweighs their financial

cost. Additionally, as in the past the Sanctuary will encourage private and nonprofit mooring buoy maintenance programs. Sanctuary staff have trained various nonprofit groups such as *Reef Relief* in the techniques of mooring buoy installation and have assisted these groups in the installation of mooring buoys in their areas. This relationship has been very positive in protecting coral reefs, developing partnerships within the community, and serving as a way to get outside funding for this important means of resource protection.

### **Regulatory Action Plan**

The Regulatory Action Plan is divided into two sections. One section discusses the strategies developed in the MP/EIS planning process that contain a regulatory component and the second contains the regulations. Public comments focused on the draft regulations contained in the second section. Therefore, this Final Management Plan and analysis is specific to the public comments made on the draft regulations.

Drawing upon 20 years of management experience in the Key Largo and Looe Key Sanctuaries, NOAA developed regulations that protect natural and historic resources. Along with education and research, regulations are an integral tool for managing human activities in National Marine Sanctuaries. This regulatory section is based on the revisions made to the draft plan resulting from the public review process. The regulations have been developed to comply with the goals and objectives set forth in the Florida Keys National Marine Sanctuary and Protection Act and the National Marine Sanctuaries Act. The FMP/EIS is also the result of a careful balancing of resource protection and compatible multiple uses.

In addition to establishing new regulations, NOAA intends to utilize, to the extent possible, existing regulations under Federal, State, and local laws that already regulate some portion of the actions called for in specific management strategies. Because coordination with existing authorities is an important component of comprehensive ecosystem management, the Sanctuary regulations will supplement, not replace, existing authorities.

The Final regulations address 19 of the 53 management strategies that have a regulatory component in the FMP/EIS. The other 34 strategies are either regulations that have already been established by another agency, or strategies that need scientific analysis before they can be implemented.

The regulatory action plan is intended to establish a comprehensive and coordinated regulatory program for the FKNMS to ensure the protection and use of Sanctuary resources in a manner that:

- complements existing regulatory authorities;
- facilitates all public and private uses of the Sanctuary that are consistent with the primary objective of resource protection;
- utilizes a system of temporal and geographic zoning to ensure effective site-specific resource protection and use management;
- ensures coordination and cooperation between Sanctuary management and other Federal, State, and local authorities with jurisdiction within or adjacent to the Sanctuary;
- achieves simplicity in the regulatory process and promotes ease of compliance with Sanctuary regulations;
- promotes mechanisms for making informed regulatory decisions based on the best available research and analysis, taking into account information about the environmental, economic, and social impacts of Sanctuary regulations; and
- complements coordination among appropriate Federal, State, and local authorities to enforce existing laws that fulfill Sanctuary goals.

There are a number of existing Federal and State conservation laws that either partially or entirely address some regulatory components of the various management strategies. NOAA's Final regulations supplement existing laws and regulations and avoid unnecessary duplication except in instances where agencies involved in the planning process specifically requested an overlap of Sanctuary regulations. Clearly, effective enforcement of relevant existing Federal, State, and local regulations will be important for maintaining the health of the Sanctuary.

Generally speaking, the suggested changes to the draft regulations are not substantial in scope and NOAA has made every attempt to address the significant concerns raised regarding the draft regulations. This section includes a description of the revisions to the draft regulations. Also included is a discussion of the expected environmental and socioeconomic consequences of the regulations established for the Sanctuary in this Final Manage-

ment Plan. A longer discussion of the environmental consequences is contained in Volume II and an expanded discussion of the socioeconomic consequences for the regulations is contained in Appendix M, Volume III.

The Sanctuary regulations are found in the Regulatory Action Plan (Volume I) Part 922, Subpart P - Florida Keys National Marine Sanctuary. It is important to note that the regulations are divided into sections based on their specific intent. The Prohibited Activities section is divided into two sections: (1) Prohibited activities - Sanctuary-wide; and (2) Additional activity regulations by Sanctuary area (zone). The Sanctuary-wide prohibitions include regulations that prohibit, restrict, or manage: oil drilling; injury or removal of coral or live rock; alteration or construction on the seabed; discharging materials such as pollutants; operation of vessels; diving without a flag; release of exotic species; tampering with markers; removing or injuring Sanctuary historical resources; taking or possessing protected wildlife; possession or use of explosives or electrical charges; interfering with law enforcement officers; and adoption of the state regulations on tropical fish and marinelife collecting throughout the Sanctuary. The second Prohibited Activities section are regulations that specifically address management needs for each area type. These regulations are especially useful in focusing management actions in geographically concentrated areas which will be environmentally beneficial in these areas. By concentrating the regulations in zoned areas the broader socioeconomic consequences on any user group will be lessened or eliminated. For example, during the 1991 scoping hearings for the Sanctuary, members of the public expressed a broad range of concerns about spearfishing. Some wanted spearfishing prohibited throughout the Sanctuary, while others wanted no restrictions on spearfishing. The no-take Sanctuary zones help balance these concerns. By prohibiting spearfishing in the heavily used areas of the coral reef, NOAA will provide environmental protection from this activity and there will be positive environmental benefits. However, by allowing spearfishing in the other parts of the coral reef that experience fewer users, the socioeconomic consequences will be lessened by using the zoning concept.

The following are specific changes to the draft regulations that appeared in the DMP/EIS. As part of the Administration's regulatory streamlining, technical changes to the format of the Sanctuary regulations have been made to incorporate the draft FKNMS regulations into 15 CFR Part 922 (National

Marine Sanctuary Program Regulations), as opposed to the FKNMS regulations standing alone in Part 929. Sections 922.3, 922.42, 922.45, 922.46 and 922.50 are found in Subparts A and E of 15 CFR Part 922 and apply to all sanctuaries and are very similar to provision of the draft FKNMS regulations. Sections 922.160, 922.161, 922.162, 922.163, 922.164, 922.165, 922.166, 922.167, and 922.168 are sections applicable only to the FKNMS and will appear in a new Subpart P to 15 CFR 922.

§ 929.1 Purpose (Now § 922.160). (No other Change)

§ 929.2 Boundary (Now § 922.161). (No other Change)

§ 929.3 Definitions (Now § 922.3 - Definitions applicable to all National Marine Sanctuaries; and § 922.162 - Definitions applicable to the Florida Keys National Marine Sanctuary only). (Revised)

The definitions in this section have been separated into those definitions applicable to all National Marine Sanctuaries (§ 922.3), including the Florida Keys National Marine Sanctuary, and those definitions applicable only to the Florida Keys National Marine Sanctuary (§ 922.162).

New definitions including those for corals, coral areas, coral reefs, hardbottoms, and residential shorelines were added to the Final Management Plan. These revisions were made based on public comments and to clarify the applicability of the regulations. The revisions should have no additional adverse impacts on the environment or Sanctuary users.

§ 929.4 (Now § 922.42) Allowed activities. (This section was revised based on recommendations from the SAC and has been incorporated into the sanctuary program regulations of general applicability in 15 CFR Part 922, Subpart E)

§ 929.5 (Now § 922.163) Prohibited activities - Sanctuary Wide (Revisions Made)

There were some revisions to the Sanctuary-wide draft regulations based on the public review of the DMP/EIS. These changes were made in the operation of vessels section of the Sanctuary-wide prohibited activities. Anchoring on corals is a threat to the health of coral reefs in the Florida Keys. This is especially true in areas of concentrated vessel use. Mooring buoys have been installed on some heavily used reefs to prevent anchor damage (see Mooring

Buoy Action Plan, Volume I). Commentors indicated that this was not a practical solution for all the areas where fishermen conduct their activities, especially over some of the deeper reef habitats. However, anchoring on corals can be addressed in some areas where the boat operators should be able to see the bottom. Visibility of the bottom is now an element of the prohibition.

Since prohibiting anchoring on corals throughout the Sanctuary would be overly-restrictive and would have serious socioeconomic impacts on users, NOAA proposed draft regulations that prohibited anchoring a vessel on coral, in depths less than 50 feet. Reviewers of the draft plan, including the SAC, said this was too restrictive, especially in the Lower Keys where visibility often prevents a boat operator from being able to see the bottom at such depths. This is not the case in much of the Upper Keys, but still applies on some days when low visibility occurs. There would be greater environmental benefits from having this protection in all waters shallower than 50 feet. However, this regulation would have serious socioeconomic consequences in areas that are used regularly by fishermen when they can't see the bottom.

In the Final Plan, NOAA has restricted anchoring a vessel on coral in depths less than 40 feet of water when visibility is such that corals on the seabed can be seen. This prohibition does not apply to anchoring on hardbottom. The SAC recommended this regulation in their comments to NOAA, while some groups requested the prohibition apply throughout the Sanctuary, and others wanted no prohibition at all. This alternative will have positive environmental benefits by preventing anchor damage to coral reefs, thus protecting these resources from a source of direct impact that can be prevented. The socioeconomic consequences of this restriction will not have any direct economic impact on the visitor, but the overall, long-term economic benefit to society from protecting these important resources from anchor damage will far outweigh any inconveniences of having people be careful when they are dropping their anchors.

Fifty one percent (51%) of the public comments on the DMP/EIS addressed the issue of personal watercraft (PWCs or jet skis). The majority of them requested that NOAA not single personal watercraft out in its final regulations. Many of the public comments reminded NOAA that personal watercraft owners and users should act responsibly. Others asked that NOAA severely restrict, or even prohibit the operation of personal watercraft within the

Sanctuary. NOAA also received comments noting frequent environmental nuisance and safety issues associated with the operation of personal water craft. These included: reckless operating behavior, harassment of endangered and other species, harassment of other boaters (including disruption of fishing on flats), and noisy operation in canals and adjacent to residential shorelines. These commentors requested limiting and restricting or banning the use of personal water craft within the Sanctuary.

NOAA has developed a multi-prong approach to address the public's concern about the use of personal water craft. NOAA has accepted the SAC's recommendation to add a new section to the final regulations which prohibits reckless operation of watercraft. Additionally, Section 929.5 (a)(5) (now § 922.163 (a)(5)) has been modified to prohibit operating a vessel at greater than idle speed only/no wake within 100 yards from residential shorelines, stationary vessels (except in marked channels) and navigational aids marking emergent or shallow reefs. NOAA has also incorporated into its regulations the ability to address negligent behavior and the authority to enforce all idle-speed only/no wake zones established throughout the Sanctuary. NOAA will use the existing county and State process for designating these zones and it is likely that these areas will be used to restrict personal watercraft in certain residential and other areas where they continue to be a nuisance or safety problem. The industry has indicated it is seriously committed to "self regulation" and is willing to work with NOAA to develop successful educational efforts geared toward changing user behavior. In particular, the PWC industry agreed to work with Sanctuary staff to establish criteria for the management of commercial PWC rental operations. The final component of NOAA's approach to PWC's is a modification of the SAC's recommendations. If initial efforts are not successful at significantly reducing or eliminating the nuisance and safety problems, NOAA will consider implementing broad zoning restrictions consistent with SAC recommendations. Such zoning has been successfully implemented in the Monterey Bay National Marine Sanctuary.

Based on its review of the public comments and consideration of the SAC recommendations, NOAA has established a series of regulations that address the operation of all vessels, including personal watercraft.

In the DMP/EIS, NOAA did not single out PWCs because other vessels used inappropriately also could impact the resources and users of the Sanctu-

ary. Instead, NOAA proposed prohibiting the operation of all vessels at a speed greater than idle speed only/ no-wake within a residential canal, within 100 yards of the red and white "divers down" flag (or the blue and white "alpha" flag in Federal waters), or within 200 yards of:

- residential shorelines,
- mangrove fringed islands,
- stationary vessels, or
- signs indicating emergent or shallow reefs.

NOAA received considerable public comment on this draft regulation designed largely to address user conflicts and impacts to Sanctuary resources. A large number of commentors felt the 200 yard distance was impractical, especially in the Lower Keys where there are many islands with less than 400 yards between them and this restriction would create a burden. Boat operators would in some instances be forced to motor long distances at idle speed. This could potentially have adverse environmental impacts, especially in areas where it would be too shallow for conventional propeller driven boats to motor without remaining on a plane. There are many areas in the Lower Keys that will not be marked with channel markers, yet boaters need to transit through them. This restriction would have socioeconomic impacts on users and little environmental benefit. NOAA agrees and has made the following revisions in the Final Plan. The final regulation will prohibit operating a vessel at a speed greater than idle speed only/no-wake, except in marked channels and other less restrictive marked areas:

- in areas designated idle speed only/no wake zones;
- within 100 yards of navigational aides indicating emergent or shallow reefs (international diamond warning symbol);
- within 100 feet of the red and white "divers down" flag (or the blue and white "alpha" flag in Federal waters);
- within 100 yards of residential shorelines; or
- within 100 yards of stationary vessels.

In developing this final regulation, NOAA considered the existing regulations in the USFWS Refuges in the Lower Keys regarding the operation of vessels near

sensitive mangrove islands and their regulation that prohibits PWCs in some areas. The zoning (WMAs) regulations address the operation of vessels and PWCs in the Lower Keys Refuges. Therefore, the regulations on operation of vessels within 100 yards of residential shorelines and stationary vessels is considered to address resource impacts and user conflicts. Since mangrove fringed islands are no longer included in the final regulations, the geographical orientation of the Lower Keys with narrow passes between islands will not create a burden on users who need to transit long distances to the Gulf. Considering that 19 of the Wildlife Management Areas fall within this Lower Keys Region, where vessel access and operation are already managed, NOAA feels that complementing the USFWS regulations in the WMAs will have positive environmental benefit and low socioeconomic losses.

Additional regulations on the operation of vessels will include: (1) a prohibition on operating a vessel in such a manner as to injure, take or cause disturbance to wading, roosting, or nesting birds, or marine mammals; and (2) operating a vessel in a manner which unreasonably or unnecessarily endangers life, limb, marine resources, or property, including but not limited to, weaving through congested vessel traffic, jumping the wake of another vessel unreasonably or unnecessarily close to such other vessel or when visibility around such other vessel is obstructed, or waiting until the last possible moment to avoid a collision. These regulations will have positive environmental benefits and the socioeconomic impacts will be high if some action is not taken to manage operation of vessels.

The final regulations on the operation of vessels will have strong environmental benefits by preventing the harassment and disturbance of wildlife in the Sanctuary. This is particularly true along mangrove fringed shorelines and in shallow nearshore habitats. Here vessels operated too close to the mangroves cause the flushing of nesting birds, leaving their eggs exposed to extreme temperatures with resultant loss of the clutch of eggs. This unnecessary impact will be lessened by the regulations. NOAA feels this approach to regulating the operation of all vessels will have the least amount of socioeconomic consequences on any one user group with the greatest environmental benefits directed at protecting the wildlife resources of the Florida Keys.

§ 929.6 (now § 922.164) Additional Activity Regulations by Sanctuary area. (Revisions Made)

The regulations in the Final Management Plan for the zones primarily changed in geographical extent and number of specific zones, as opposed to the specific regulations within the different zones. Those changes are described in detail in the discussion of the Final Zoning Action Plan later in this volume. The environmental consequences and the socioeconomic benefits of each of the zones are discussed in the Zoning Action Plan description of this chapter. These topics are also discussed more extensively in Volume III, Appendix M.

In the Final Management Plan the following regulated activities are those that were revised for the Ecological Reserves and the Sanctuary Preservation Areas as a result of public comment, including comments from the SAC:

- Possessing, moving, harvesting, removing, taking, damaging, disturbing, breaking, cutting, spearing, or otherwise injuring any coral, marine invertebrate, fish, bottom formation, algae, seagrass or other living or dead organism, including shells, or attempting any of these activities. However, fish, invertebrates, and marine plants may be possessed aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such resources can be shown not to have been harvested within, removed from, or taken within, the Ecological Reserve or Sanctuary Preservation Area, as applicable, by being stowed in a cabin, locker, or similar storage area prior to entering and during transit through such reserves or areas.
- Except for catch and release fishing by trolling in the Conch Reef, Alligator Reef, Sombrero Reef, and Sand Key SPAs, fishing by any means. However, gear capable of harvesting fish may be aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such gear is not available for immediate use when entering and during transit through such Ecological Reserve or Sanctuary Preservation Area, and no presumption of fishing activity shall be drawn therefrom.

These revisions to the draft regulations are based on considerable public comment and are intended to lessen the socioeconomic impact on fishermen who need to transit these zones with their catch and fishing gear. Allowing this exception will not result in any additional environmental consequences.

In regards to allowing catch and release fishing by trolling in some Sanctuary Preservation Areas (SPA) and allowing baitfishing by net for ballyhoo in all SPAs, NOAA has attempted to lessen the socioeconomic impact of the proposed regulations with limited environmental consequences. These actions were supported by the SAC's comments on the DMP/EIS and address comments from the public, particularly fishermen and related bait businesses.

The Preferred Alternative in the DMP/EIS did not allow any catch and release fishing in the SPAs. During the public review of the draft plan NOAA received considerable public comment about this issue. Many commented that NOAA should allow catch and release fishing while other commentators raised concern about the environmental impact from the activity of catching and then releasing fish. Although estimates vary about the percentage of mortality of fish caught and released, NOAA has considered the SAC's recommendation to allow catch and release fishing in "specified SPAs." NOAA further looked at aerial census data (1994, FDEP and TNC work in progress) and considered the public comment on the draft plan and selected four SPAs to leave open to catch and release fishing by trolling. This will give NOAA areas to compare and contrast this activity between areas where catch and release fishing is allowed and not allowed in order to determine its short and long-range impact. Conch Reef, Alligator Reef, Sombrero Key, and Sand Key were selected partially on aerial census data and information gathered from the public comments. NOAA feels this allowed activity will have some adverse environmental impacts, but determined the socioeconomic benefits gained by the charterboat operators will outweigh the environmental loss while this activity is being assessed. Presently, the charterboat operators rely on the shallow reefs to provide fishing action when conditions are such that the boats can't operate offshore, or when other pelagic species of fish are not running. By allowing this activity, this socioeconomic impact will be lessened.

In the DMP/EIS NOAA prohibited baitfishing in SPAs, through the overall prohibition against taking anything in these areas. However, during the public comment process NOAA gained considerable knowledge about this activity and the importance of the SPAs for providing live bait for offshore, pelagic fishing. The recreational charter fishing industry relies heavily on its access to live bait along the coral reef tract when pelagic species of fish are migrating through the Keys. There was considerable public comment requesting NOAA allow the harvest of

ballyhoo by nets in the SPAs. During the review process NOAA staff accompanied fishermen on the water for a firsthand look at ballyhoo fishing activity. Consequently, NOAA will allow ballyhoo fishing by net in the SPAs. The activity will be permitted with a no-cost, locally issued permit that fishermen can obtain at one of the Sanctuary offices. Due to the high migratory nature of baitfish across the SPAs, NOAA feels this harvesting activity will have low environmental impact on the resources and it will have high socioeconomic benefits associated with it.

There was some public concern about the ability of the Director or his designee to close SPAs to public access for a period of time. This issue was raised by the SAC and the general public as one that could have serious socioeconomic impacts on their activities. In public comments, there was a general request to establish some kind of time limit or process to close areas to public access for emergency reasons. NOAA has agreed and has revised the regulation to read as follows:

The Director will provide public notice of the restriction by publishing a notice in the Federal Register, and by such other means as the Director may deem appropriate. The Director may only restrict access to an area for a period of 60 days, with one additional 60 day renewal. The Director may restrict access to an area for a longer period pursuant to a notice and opportunity for public comment rulemaking under the Administrative Procedure Act. Such restriction will be kept to the minimum amount of area necessary to achieve the purposes thereof. In addition, the draft Co-Trustee Agreement with Florida has been modified so that the State is consulted prior to such designations, and the Governor has the authority to re-open temporary closures in State waters.

**§ 929.7 (Now § 922.165) Emergency Regulations.  
(Revisions Made)**

There was some public concern about the ability of the Director or his designee to establish emergency regulations which could affect access or activities. This issue was raised by the SAC and the general public as one that could have serious socioeconomic impacts on their activities. In public comments, there was a general request to establish some kind of time limit or process to close areas to public access for emergency reasons. NOAA has agreed and has revised the regulation to read as follows:

Any such temporary [emergency] regulation may be in effect for up to 60 days, with one 60-day extension. Additional or extended action will require notice

and comment rulemaking under the Administrative Procedure Act, notice in local newspapers, Notice to Mariners, and press releases.

§ 929.8 (Now § 922.45) Penalties. (This section is substantively the same as that in the draft, but has been incorporated into the sanctuary program regulations of general applicability at 15 CFR Part 922, Subpart E)

There was some public comment, including comment from the SAC, requesting that NOAA publish a penalty schedule for the Sanctuary in the Final Plan. The issue that prompted this request by the public and the SAC was NOAA's authority to collect \$100,000 per day per infraction. There was a misunderstanding in some public comments that this would be the amount NOAA would seek for each infraction. NOAA has encouraged the public and SAC to review the penalty schedule established for the Key Largo and Looe Key NMS as a general reference for the approximate level of penalties applied historically in those Sanctuaries. NOAA's Office of General Counsel will develop a penalty schedule for the Sanctuary and it will be available to the public.

Penalties for regulations established under the NMSA are created under civil law and therefore differ from some those established under other Federal/State jurisdictions within the Sanctuary. This will have both positive environmental benefits and overall positive socioeconomic benefits for the Sanctuary. The resources of the Sanctuary will receive a greater level of protection by providing civil authority to other agencies through cross-deputization. Enforcement of regulations is best facilitated by agencies cross deputizing to enforce civil penalties.

Civil authority and coordinated enforcement under the NMSA have positive socioeconomic impacts on society in general in that there are cost savings to the public when agencies can share authorities and combine human and material resources. The Sanctuary regulations provide supplemental civil penalty options. In some cases, civil may be more appropriate than criminal. In some cases, use of both civil and criminal may be appropriate. The resources can be better protected when there are more options for individuals enforcing the regulations. This, in turn, should lead to greater environmental and socioeconomic benefits.

Civil authority lends itself more freely to an educational and interpretive approach to enforcement of regulations in National Marine Sanctuaries. Simply the message that something is a Sanctuary violation

is all that is needed to gain compliance of the vast majority of Sanctuary users.

§ 929.10 (Now § 922.166) National Marine Sanctuary Permits - Application Procedures And Issuance Criteria. (Revisions Made)

Permits are required in National Marine Sanctuaries for conducting activities that are prohibited by sanctuary regulations. NOAA has worked with the State of Florida to identify specific areas for permits that would be certified and authorized for the conduct of activities that would normally be prohibited within the Sanctuary. In an effort to reduce the burden of permitting, NOAA has also identified other agencies with whom to coordinate permitting activities. For example, regarding placement of artificial reefs, NOAA reviews and consults with the USACE on permitting of this activity within the Sanctuary. The Sanctuary is particularly concerned with site selection. Its other concerns are largely addressed by strict compliance with the NMFS/USACE Artificial Reef Plan. Similarly, in regards to "live rock" aquaculture sites, the Sanctuary reviews and consults with the NMFS permitting process for these activities. NOAA is establishing a permitting system that maximizes use of existing systems and therefore is not expected to have a significant incremental socioeconomic impact on the public.

In addition to permits for research, education, salvage and recovery operations, and management, a Sanctuary general permit may now also be issued for an activity that otherwise furthers Sanctuary purposes, including facilitating multiples use of the Sanctuary, to the extent compatible with the primary objective of resource protection. To increase resource protection, factors in the draft permit regulations that the Director considers in determining whether to issue a permit are now findings the Director must make in order to issue a Sanctuary permit. Further, the required findings will ensure applications for Sanctuary permits to conduct otherwise prohibited activities will be evaluated equitably because the Director must address all the factors listed in the regulations in making the required findings.

Sections 929.11 and 929.12, pertaining to Sanctuary Historical Resources permits and Special-use Permits, respectively, have been incorporated into § 922.166 so there is only one permit section addressing all types of Sanctuary permits. The deaccession/transfer of public historical resources to private permittees will be done through a Special-use Permit.

**§ 929.11 National Marine Sanctuary Historical Resources Permits - Survey/Inventory, Research/Recovery, Deaccession/Transfer - Application Procedures And Issuance Criteria. (Revisions Made)**

The SCR permit system manages all activities which may impact SCRs. The regulations prohibit the removal or injury of Sanctuary historical resources. There are three types of permits which may be issued under this section, Survey/Inventory, Research/Recovery, and a Special-use Permit for Deaccession/Transfer.

In response to comments, this section was revised to make the permit management system more pragmatic from the perspective of the commercial salvors without compromising the primary objectives of protecting the submerged cultural resources.

After consultation with the State of Florida, NOAA deleted the regulatory provisions requiring a performance bond for all applicants. NOAA has also modified the regulations to clarify that other security instruments may be utilized in lieu of insurance policies. Additionally, NOAA modified regulatory language to clarify that the scope of coverage required is for "potential claims for damages to Sanctuary resources arising out of permitted activities" and to clarify that the amount of insurance or security should be reasonably equivalent with an estimated value of the Sanctuary resources in the vicinity of the permitted area and activities. These changes should make the requirement more flexible and thereby minimize some of the adverse socioeconomic consequences as compared to the draft plan.

This section has been incorporated into the Sanctuary permit section; § 922.166.

**§ 929.12 Special-use permits. (This section has been incorporated into the Sanctuary permit section; § 922.166)**

**§ 929.13 Sanctuary Registry - Research Notice. (Deleted)**

This section 929.13 was removed from the final regulations because the Sanctuary registry is voluntary and no regulation is necessary for its establishment.

**§ 929.14 (Now § 922.167) Certification Of Preexisting Leases, Licenses, Permits, Approvals, Other Authorizations, Or Rights To Conduct A Prohibited Activity. (No Change)**

**§ 929.15 (Now § 922.168) Notification And Review Of Applications For Leases, Licenses, Permits, Approvals, Or Other Authorizations To Conduct A Prohibited Activity. (No Change)**

**§ 929.16 (Now § 922.50) Appeals Of Administrative Action. (This section has been incorporated into the sanctuary program regulations of general applicability at 15 CFR Part 922, Subpart E)**

**Research and Monitoring Action Plan**

The main goal of the Research and Monitoring Action Plan is to provide the knowledge necessary for making informed decisions about protecting the Sanctuary resources. Research and monitoring is the essential first step in taking stock of the wealth represented in Sanctuary resources and planning for their conservation and use. It will do this by establishing an ecological monitoring program focusing on the no-take zones, disseminating scientific findings through a periodic report, permitting and coordinating research activities, investigating fisheries impacts, and establishing a research program on carrying capacity.

In response to public comments, minor changes were made to the Research and Monitoring Action Plan. Most public comments on the plan called for monitoring the no-take zones to determine their effectiveness. Research and monitoring of the zones was emphasized in the plan to accommodate this comment. The Sanctuary Advisory Council requested that the carrying capacity strategy be added to the plan which has been done. One State agency commented on the Strategy F.3 (moratorium on stocking) stating that it would curtail the State's ongoing queen conch stocking program. In response, the strategy was changed to call for permitting of all stocking programs.

The Research and Monitoring Action Plan in the Final Preferred Alternative will provide better scientific information in a more timely manner than was called for in the Draft Preferred Alternative; therefore, resource protection will be enhanced through more well-informed resource managers. Resource protection should be further enhanced by the permitting of research activities and the research on carrying capacity. A great many people utilize the Sanctuary resources for recreation as well as research; consequently, permitting prohibited activities will both accommodate multiple uses and minimize impacts to resources. Permitting procedures will create a minor burden in the way of paperwork for researchers and educators. Research on carrying capacity will help



reduce impacts to resources. In summary, the Research and Monitoring Action Plan will facilitate resource protection with minimal socioeconomic impacts on users.

### **Submerged Cultural Resources Action Plan**

NOAA is committed to protecting and preserving the natural resources within its national marine sanctuaries, and is equally committed to its stewardship and trustee responsibilities for the historical resources in these areas. Such resources are defined as those "possessing historical, cultural, archaeological, or paleontological significance, including sites, structures, districts, and objects significantly associated with or representative of earlier people, cultures, and human activities and events" (15 CFR 922.2 (c)). In this action plan, the terms *historical resources*, *cultural resources*, and *submerged cultural resources (SCRs)* are used interchangeably. Within the nation's national marine sanctuaries, these resources include shipwrecks that are part of both U.S. and world history, as well as the remains of submerged prehistoric cultures.

The Sanctuary's submerged cultural resources encompass a broad historical range. Because of the Keys' strategic location on early European shipping routes, the area's shipwrecks reflect the history of the entire period of discovery and colonization. This richness of historical resources brings a corresponding responsibility for protecting resources of national and international interest. Accordingly, the resources should be managed for public benefit and enjoyment, while the historical-cultural heritage is preserved for the future. Long-term protection requires a precautionary approach to historical resource management, particularly when cultural information and/or the artifacts may be destroyed or lost intentionally or unintentionally through various direct and indirect activities. The Federal Archaeological Program or equivalent standards of conservation, cataloguing, display, curation, and publication must be assured before the excavation of historically significant resources is permitted. Such projects are expensive and labor-intensive, requiring specialists in the fields of archaeology, conservation, and museum work and historic shipwreck research and recovery. NOAA and the State will explore all public and private partnerships in fulfilling SCR management and will consider private sector implementation, if it is determined to be in the public's interest.

**Sanctuary Goals.** The Sanctuary has a trustee responsibility for protecting the cultural resources within its boundaries for current users and future

generations. Because cultural resources are nonrenewable, decisions affecting these resources must be made with a precautionary approach, and only after careful and deliberate analyses of the potential consequences on long-term preservation.

The goals of the Florida Keys National Marine Sanctuary's Submerged Cultural Resources Program are to:

- gather sufficient information about the nature and extent of the area's cultural resources to allow managers to make informed decisions about resource protection and management;
- interpret the history and culture of the Keys for the public;
- allow/permit private-sector participation research, documentation, recovery, and curation of cultural resources; and
- to develop a community-based stewardship for cultural resources in the Sanctuary.

NOAA and the State of Florida carefully balanced the environmental and socioeconomic consequences of the management alternatives, including a no action alternative in developing a final SCR plan which is the final preferred alternative. This plan is also consistent with the resource protection and multiple use mandates in the National Marine Sanctuaries Act and the Abandoned Shipwreck Act (ASA). To protect SCRs, the regulations prohibit the removal or injury of Sanctuary historical resources. The environmental consequences should be positive for both SCRs and natural resources. There will be adverse socioeconomic impacts to commercial treasure salvage operators from this regulation. However, a SCR permit system has been established to minimize these impacts in a manner which is compatible with the primary objective of resource protection.

The SCR permit system manages all activities which may impact SCRs. The Programmatic SCR Agreement further details the management of SCRs to address the concerns of the National Historic Preservation Act, section 106. While "treasure hunting" in its traditional sense is not permitted in the Sanctuary, the SCR plan does provide for limited public and private sector recovery of certain objects consistent with the protection of natural and historical resource values and particularly the environmental integrity of the shipwrecks and sites. The plan's policy preference is it to preserve highly significant SCRs on site

within the Sanctuary and strictly regulate the recovery of SCRs to ensure that recovery is only permitted when determined to be in the public's interest and is done in an environmentally and archaeologically sound manner. To ensure positive environmental consequences, there will be no recovery permits issued in areas where there is coral, seagrass or other significant natural resources. However, to minimize the adverse socioeconomic impacts on commercial treasure salvors, private recovery of SCRs of low to moderate significance may be permitted in other areas of the Sanctuary which are relatively devoid of natural resources. Any SCR may be recovered if they are threatened or may otherwise be lost should they remain in the Sanctuary. In order to ensure positive environmental consequences, such recovery efforts will be strictly regulated and will require that any highly significant resources be preserved in a museum with public access consistent with the standards of the Federal Archaeological Program. In order to minimize the socioeconomic impacts to commercial treasure salvors, objects of low to moderate historic or archaeological significance may be deaccessioned or transferred for sale or other disposition.

The final plan ensures that there will be SCRs in the Sanctuary for research, education and recreational use. This should have positive environmental and socioeconomic consequences. See the environmental and socioeconomic impact analyses in Volume II and the OIRA analysis in Appendix M of Volume III.

To ensure positive environmental consequences, there is no commercial salvage permitted in the zoned areas and other areas of significant natural resources. To minimize adverse socioeconomic consequences, commercial salvage is permitted but to ensure positive environmental consequences, it is only permitted in areas relatively devoid of significant natural resources.

The permits for private recovery and deaccession/transfer only apply to abandoned vessels. As a trustee for such resources, NOAA will continue to respect the interests of the owners of the vessels and the sovereigns that represent those interests consistent with domestic and international law. Sunken warships and other public vessels entitled to sovereign immunity, regardless of location, remain the property of the nation to which they belonged at the time of sinking, unless that nation has taken formal action to abandon them or to transfer title to another party. It is a long-standing Navy policy that it does not abandon its public vessels. Therefore, no permits will be issued for the private recovery of

Navy vessels without the express written permission of the Navy. In considering permits for the private recovery of other vessels entitled to sovereign immunity, NOAA may require the express permission of the appropriate sovereign representatives, or otherwise consider their interests in the vessel and its recovery.

In order to avoid adverse environmental consequences, commercial treasure salvage is strictly regulated to prevent harm to natural resources from various commercial treasure salvage methodologies, including "mail-boxing" (propeller dredging device).

Pursuant to consultation with the State of Florida, NOAA agreed to delete the regulatory provisions requiring a performance bond for all applicants. While the removal of this regulatory requirement should reduce the costs for meeting the permit criteria for most applicants, such performance bond may still be reasonable and appropriate in certain cases where applicants have not finished projects or have difficulty demonstrating their financial ability to complete the proposed project. In such cases, there will be socioeconomic costs involved in getting the bond.

The general liability insurance is a statutory requirement under Section 310 of the NMSA. However, commentors indicated that insurance companies were not providing policies for such coverage. NOAA has modified the regulatory provision in the final regulations to clarify that other security instruments may be utilized in lieu of an insurance policy so the requirement is more flexible. In addition, NOAA modified regulatory language to clarify that the scope of coverage required is for "potential claims for destruction, loss, or injury to Sanctuary resources arising out of permitted activities" and to clarify that the amount of insurance or security should be reasonably equivalent with an estimated value of the Sanctuary resources in the vicinity of the permitted area and activities. These changes should make the requirement more flexible and thereby minimize some of the adverse socioeconomic consequences as compared to the draft plan.

With regard to the requirement that SCRs be publicly displayed, NOAA did not intend to require that all SCRs be publicly displayed for all time. Instead, it was expected that this would be addressed in the curation agreements and that standard museum practices would be followed, consistent with the Federal Archaeological Program (FAP). The regulations have therefore been modified to indicate that permittees must provide public access and "periodic"

public display. The regulations also provide for a permit to deaccession certain SCRs. These changes make the plan more flexible, pragmatic, and thereby reduce some of the socioeconomic impacts as compared to the draft plan.

With regard to the requirement that a professional archaeologist be in charge of the archaeological research and recovery, that requirement has not been changed or modified. Recovery of historical and cultural resources inherently involves the destruction of contextual and other important archaeological information. The only way that such information is preserved through scientific recording of the recovery efforts consistent with standard archaeological principles. It is therefore imperative for environmental and socioeconomic reasons that a professional archaeologist supervise the recovery operations to ensure preservation standards are met. That is not to say that, as supervisor, the archaeologist needs to be on site at all times in every permit. However, the archaeologist needs to oversee the operations. The public's interest in the preservation of this archaeological information justifies the additional socioeconomic costs to the permittee. In addition, the administrative record indicates that many commercial salvors already employ an archaeologist, so the impact may be minimal.

With regard to the requirement of a professional nautical conservator, the plan has been modified to delete "professional" and insert "authorized" as suggested in comments in order to provide more flexibility in the permit system and allow for the consideration of field experience. As the professional archaeologist is responsible for supervising the operations, there appears to be no adverse environmental impacts to make this change which will make it more flexible and thereby minimize the socioeconomic consequences as compared to the draft plan.

With regard to the impacts from a special use permit, Section 310 of the National Marine Sanctuaries Act provides the authority for issuing Special Use Permits. The two criteria for Special Use Permits are set forth in Section 310 of the NMSA. Section 310 also provides for the assessment of associated fees which are to cover the administrative costs as well as a fair market value return to the public for use of public resources. Thus, while there will be adverse socioeconomic impacts to permittees, it is strictly minimized to conform to those described in the statutory provisions in NMSA Section 310.

With regard to the assessment of costs and waiver of fees, in implementing Special Use Permit authority,

NOAA has the discretionary authority to consider waiver of costs and/or fees on a case by case basis when permitted activities result in a public benefit, whose value can be determined. For example, in the SCR context, the preferred policy is that the SCR be preserved on site. Waiver of fees for the removal of SCRs which are not under threat is unlikely. However, if it is determined that the SCR is being threatened by remaining in the Sanctuary, the research and recovery would appear to be in the public interest and reduction and/or waiver may therefore be considered in the cost and/or fee determination. The extent that private use is furthering resource protection, research, education and similar FKNMS management strategies is given due consideration in determining the amount of costs and fees. Thus, the plan contemplates the further consideration of environmental and socioeconomic considerations in the permit process.

Under the no action alternative, the recovery of SCRs would require an Antiquities Act permit from either DOI or NOAA, in addition to requirements under the State contract system in State waters and Admiralty Law in Federal waters. Extending the Florida contract system and the division ratio (80% salvor- 20% State) uniformly throughout the sanctuary was considered as an alternative, but was not preferred because it is inconsistent with the Federal Archaeological Program and with the Abandoned Shipwreck Act Guidelines. Prohibiting commercial salvage throughout the Sanctuary was also considered and rejected for environmental and socioeconomic reasons indicated above. The SCR Plan is the result of a careful balancing of resource protection and reasonable accommodation for commercial salvage in certain areas for certain SCRs. In developing the draft plan, NOAA considered the threats to natural and historical-cultural resources and sought to develop strict regulations to ensure recovery was environmentally and archaeologically sound, while at the same time, propose a permit system that was sensitive to the socioeconomic considerations of the commercial salvors and others. Similarly, in response to comments, additional changes were made in the final regulations and plan in an effort to make the permit management system more pragmatic from the perspective of the commercial salvors without compromising the primary objectives of protecting significant natural and historic Sanctuary resources. The permit conditions may be more rigorous than the requirements of the Admiralty court or the State contract system, and thus may involve additional costs, those permittees continue to work their sites.

One of the alternatives suggested in comments was that all SCRs be removed from the Sanctuary. The final policy preference under the FKNMS Plan, consistent with the preservation policy in the Federal Archaeological Program, and the resource protection mandate in the NMSA is that SCRs be preserved on site in the Sanctuary, unless the SCRs are under threat and removal is required to preserve them. As indicated above, there has been some accommodation for commercial salvage in certain areas of the Sanctuary and for certain SCRs to facilitate multiple use of SCRs in this Sanctuary. Besides being inconsistent with resource protection, the suggestion that all or most of the SCRs be removed from the Sanctuary is not consistent with the multiple use mandates of the National Marine Sanctuaries Act and the Abandoned Shipwreck Act and has therefore not been incorporated. The Abandoned Shipwreck Act and the NMSA are both concerned about public access to SCR for boaters, divers and others within the Sanctuary. The suggested change in policy appears to primarily benefit one special interest group, the commercial salvors. Access to Sanctuary resources for members of the public unable to enter the Sanctuary itself is accomplished through a variety of education and research products and mediums, including print, film, and computer informational products. The public access goal does not require physical access to the SCRs, nor does it require their removal for land based exhibits. However, as previously indicated, in this Sanctuary, the SCR plan provides for commercial salvage which will in turn result in the public display of certain recovered SCRs in museums and similar institutions of public access.

Another management alternative suggested in the comments was that the Florida Department of State/Bureau of Archaeological Resources have the lead responsibility in the management of SCRs and that NOAA's role be limited to a financial assistance role. It was also suggested that the SCR inventory be accomplished through the use of the private sector, when funding is available, in order to lessen the burden on taxpayers.

No change was made to the plan regarding NOAA's lead responsibility for the management of SCRs including inventory. The National Historic Preservation Act Section 110 requires Federal agencies to inventory historic resources such as SCRs under the Federal agencies management responsibility. However, as indicated in the plan, NOAA will work with the State and any other public and private entities interested in activities which fulfill this responsibility. Accordingly, the SCR plan has been

revised to indicate that NOAA will also consider all public and private opportunities for accomplishing the inventory in a reasonable and cost-effective manner, including private sector funding through permits and otherwise.

Commentors suggested that the regulations expressly state that no Sanctuary permit is required for non-intrusive non-exclusive remote sensing activities, but also suggested that the survey/inventory permits expressly grant exclusive rights to explore the permitted areas. It was also suggested that these permits provide for limited manual alteration of the seabed, including hand fanning, provided there is no negative impact to coral, seagrass, sponges and other natural resources. The final plan clarifies that non-intrusive remote sensing is not prohibited. Therefore, the regulations expressly state that such activity does not require a permit. The regulations will indicate that permits may provide for limited manual alteration of the seabed, including handfanning, provided there is no adverse effect on Sanctuary resources. Such activity will continue to be considered on a case-by-case basis as part of the public interest balancing on whether to issue a permit and for determining the appropriate conditions to protect resources and manage multiple uses.

Commentors suggested exclusive rights for a survey-inventory permit but also suggested that remote sensing not require a permit. NOAA cannot prevent non-intrusive remote sensing in an area unless its prohibited in the regulations and the regulations do not prohibit remote sensing. However, NOAA and the State are cognizant of the underlying economic concerns of applicants and permittees in investing and expending financial resources exploring. Therefore, in an effort to reconcile these comments, the regulations have been modified to indicate that NOAA will not grant survey and inventory permits or research and recovery permits for areas covered by existing permits, unless authorized by such permittee. There is no entitlement to these and other permits, rather it involves the discretionary authority of NOAA and the State in granting a privilege which is determined to be in the public's interest.

#### **Volunteer Action Plan**

The Volunteer Program is designed to support the Sanctuary Program's efforts to improve public education and awareness regarding the proper treatment of the area's natural and cultural resources. Volunteers will provide a mechanism for increasing the community's involvement in Sanctuary activities, and represent a valuable resource that can

be used to accomplish a variety of Sanctuary-related tasks. Also, because of limits on financial resources, volunteer assistance will be critical to the ultimate success of the Keys' management program, and a main goal will be to use the available volunteer resources as completely as possible. The overall goal of the Volunteer Program is to provide a "hands-on" opportunity for public involvement in supporting the protection and preservation of Sanctuary resources.

While all comments on the Volunteer Action Plan were positive some specific comments were made requesting modifications to the plan. The goals of the Volunteer Plan were updated to include the future development of a strategy to target volunteer recruitment and strategy B.8: User Fees was deleted in response to these comments.

Clearly, the Volunteer Plan has enormous positive social impact. Volunteerism benefits the environment as well as the people who give of their time and effort. The general public, too, benefits from a cleaner, healthier environment fostered through the educational efforts of volunteers. The cost of this volunteer program is nominal in light of the benefit it provides to all.

### **Water Quality Action Plan**

This action plan provides the strategies critical for improving water quality throughout the Florida Keys. It addresses critical issues including pollution from stormwater runoff, improper wastewater treatment, marinas and live-aboards, landfill sites, hazardous material spills, pesticides and herbicides, and external influences. Corrective actions, monitoring, research, and public education and outreach strategies will reduce the threat of pollutants and improve water quality.

The degradation of water quality over the past two decades has been a major concern for the residents of the Keys and was the primary issue raised at the scoping meetings for the Sanctuary. In passing the Act designating the Sanctuary, Congress recognized the critical role of water quality in maintaining Sanctuary resources. Congress directed the Environmental Protection Agency (EPA), in conjunction with the Governor of the State of Florida and in consultation with the Secretary of Commerce, to develop a comprehensive Water Quality Protection Program (WQPP) for the Sanctuary. This action plan is an abridged version of the information in the WQPP document. It is also the first water quality plan ever developed for a national marine sanctuary.

The WQPP consists of four interrelated components: corrective actions, monitoring, research/special studies, and public education and outreach. Corrective actions would reduce water pollution directly by using engineering methods or by prohibiting or restricting certain activities, tightening existing regulations, and/or increasing enforcement. Other corrective actions would make the regulatory system work more efficiently. The water quality monitoring program would provide information about the status and trends of water quality and biological resources in the Sanctuary and the effectiveness of corrective actions. Research and special studies would identify and document cause/effect linkages between pollutants, water quality problems, and ecological impacts. Research would also increase understanding of Sanctuary ecosystems and improve predictive capabilities. Public education and outreach strategies would increase public awareness of the Sanctuary, the WQPP, and pollution sources and impacts on Sanctuary resources.

Public comment precipitated changes to both the WQPP document and the Water Quality Action Plan. For the most part, commentors agreed that degradation of water quality is the greatest threat to both the natural resources and the economy of the Keys. They also agreed that funding for this program is vital. Some were more concerned about the influences of water quality from sources beyond Sanctuary boundaries. However, the plan addresses outside influences to water quality, and the Water Quality Protection Program Steering Committee explores this issue regularly. A few commentors stated that there was no water quality problem in the Keys. However, many scientists and users disagree with this statement based on observations as well as documented scientific evidence.

Improved water quality in the Keys will have environmental and socioeconomic benefits. Sanctuary resources such as coral reefs and seagrass beds sustain enormously valuable commercial and recreational fisheries and attract anglers, divers, and tourists from all over the world. The economy of the Florida Keys is tied directly to these resources which depend on the maintenance of outstanding water quality, including high water clarity, low nutrient levels, and low concentrations of contaminants. If water quality is allowed to deteriorate further, thriving industries such as fishing and tourism, as well as support businesses, will suffer the consequences. The WQPP would improve and maintain water quality, helping to ensure that Sanctuary resources and the economy dependent on them continue to thrive.

## Zoning Action Plan

Zoning is the setting aside of areas for specific activities to balance commercial and recreational interests with the need for a sustainable ecosystem. Marine zoning has been successfully implemented at Australia's Great Barrier Reef, New Zealand, Kenya, the Philippines, the Cayman Islands, Bermuda, Exuma National Park in the Bahamas, and other countries. The concept has had limited application in the U.S. where it has been used at Looe Key National Marine Sanctuary (1981) to protect the shallow coral reef habitat from certain activities such as anchoring and setting of lobster traps and in the Monterey Bay National Marine Sanctuary (1992) to manage PWC activities. It has also been used in the Channel Islands National Marine Sanctuary/National Park where *Harvest Refugia* have been established to protect marine inhabitants from harvest. Only in the past few years have the Fisheries Management Councils used zoning to protect and manage fisheries, such as the closed *Oculina Banks* off the east coast of Florida.

The consideration of marine zoning as an integral Sanctuary management tool is mandated under section 7(a)(2) of the FKNMSPA. The process used to develop the draft zoning plan is described in Volume II. There were five zone types proposed in the draft plan that was reviewed by the public. Those zone types were: Wildlife Management Areas; Replenishment Reserves (renamed to Ecological Reserves); Sanctuary Preservation Areas; Existing Management Areas; and Special-use Areas. All of these zone types remain in the Final Management Plan to be implemented in the Sanctuary.

Figure 1 shows the existing management zones in the Sanctuary region. Figure 2 shows the zones proposed in the plan. Table 2 shows the sizes of some of these proposed zones.

The goals of the zoning action plan are:

- Protect and preserve sensitive areas of the ecosystem by regulating certain activities that occur within the zoned areas, and by facilitating activities that are compatible with resource protection;

Table 2. Sizes of FKNMS Sanctuary Preservation Areas, Ecological Reserves, and Special-use Areas

Zone	km <sup>2</sup>	nm <sup>2</sup>	ha
<b>Florida Keys NMS</b>	<b>9,515.5</b>	<b>2,774.3</b>	<b>9,51547.1</b>
<b>Sanctuary Preservation Areas</b>	<b>16.5</b>	<b>4.7</b>	<b>1,650.6</b>
Carysfort/South Carysfort Reef	5.1	1.5	514.5
The Elbow	0.9	0.3	90.2
Dry Rocks	0.2	0.0	15.5
Grecian Rocks	1.1	0.3	107.4
French Reef	0.4	0.1	36.8
Molasses Reef	0.9	0.3	88.6
Conch Reef	0.2	0.1	23.3
Davis Reef	0.6	0.2	57.7
Hen and Chickens	0.6	0.2	60.2
Cheeca Rocks	0.2	0.0	15.5
Alligator Reef	0.6	0.2	59.8
Coffins Patch	1.5	0.4	147.0
Sombrero Key	0.7	0.2	73.4
Looe Key	1.1	0.3	114.6
Newfound Harbor Key	0.4	0.1	42.6
Eastern Dry Rocks	0.3	0.1	27.4
Rock Key	0.3	0.1	25.1
Sand Key	1.5	0.4	151.0
<b>Ecological Reserves</b>	<b>30.8</b>	<b>9.0</b>	<b>3,084.1</b>
Western Sambos	30.8	9.0	3084.1
<b>Special-use Areas</b>	<b>1.9</b>	<b>0.5</b>	<b>186.0</b>
Conch Reef (Research Only)	0.7	0.2	71.7
Tennessee Reef (Research Only)	0.5	0.2	53.1
Looe Key (Research Only)	0.3	0.1	33.5
Eastern Sambos (Research Only)	0.3	0.1	27.7

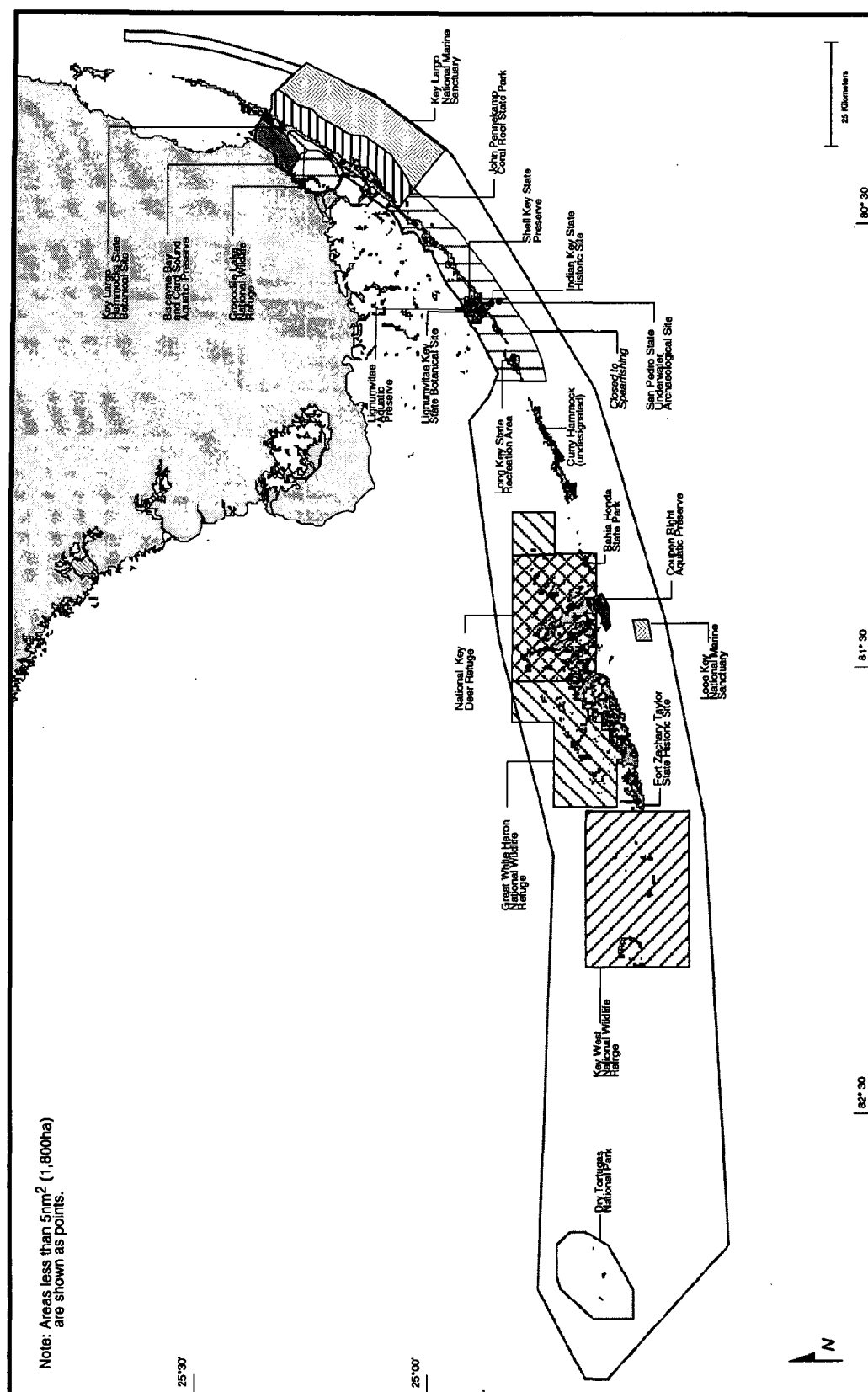
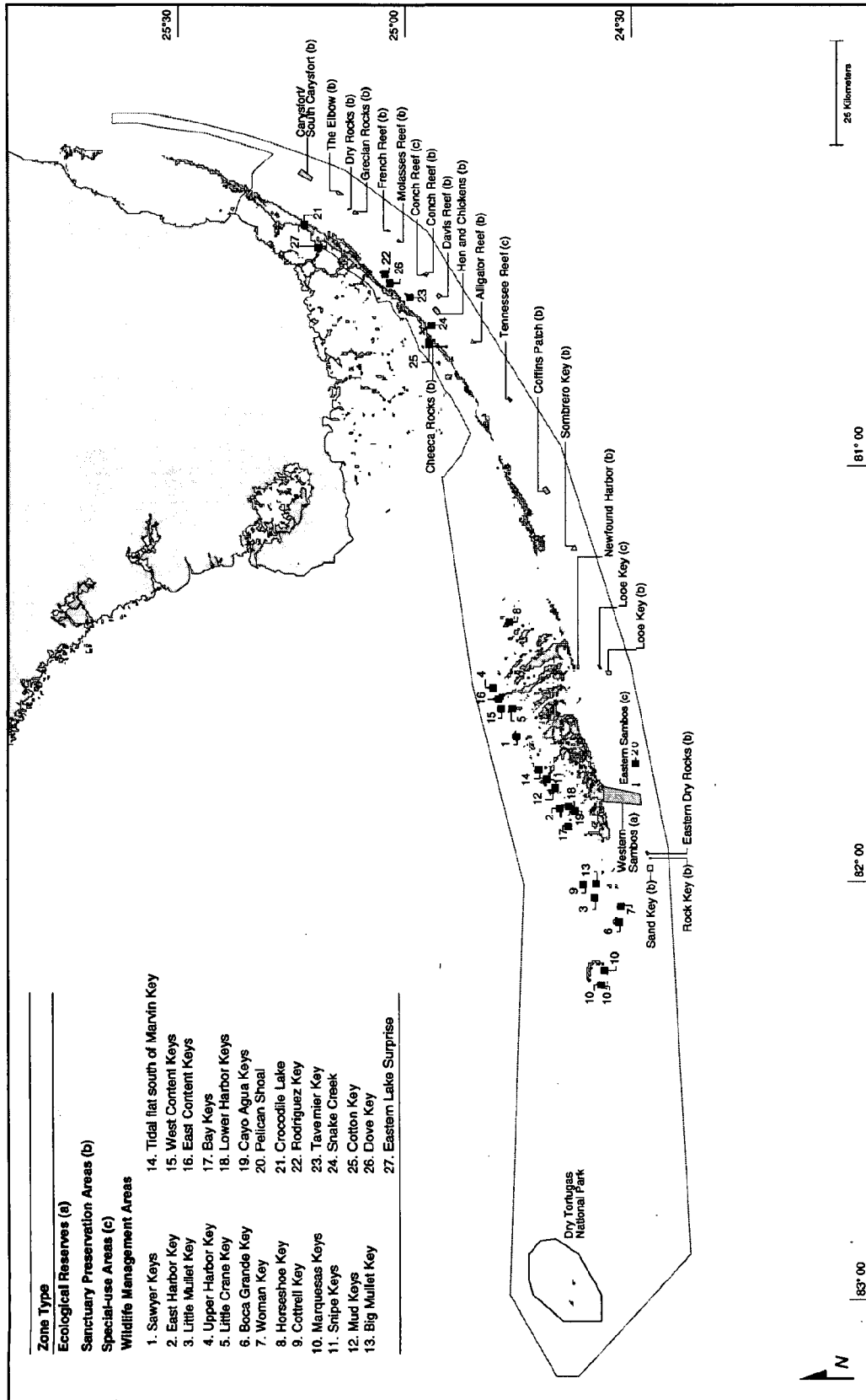


Figure 2. Ecological Reserves, Sanctuary Preservation Areas, Special-use Areas, and Wildlife Management Areas





- Ensure that areas of high ecological importance evolve naturally, with minimal human influence; and
- Protect areas representing a wide variety of habitats, and areas that are important for maintaining natural resources and ecosystem functions.

Each zone or area is designed to reduce damage to the environment, while allowing recreational activities to occur, as long as they are compatible with resource protection.

The Objectives necessary to achieve these goals are:

- reduce stresses from human activities by establishing areas that restrict access to especially sensitive wildlife populations and habitats;
- protect biological diversity and the quality of resources by protecting large, contiguous diverse habitats that are intended to provide natural spawning, nursery, and permanent residence areas for the replenishment and genetic protection of marine life and to protect and preserve all habitats and species;
- minimize conflicting uses;
- protect Sanctuary resources and separate conflicting uses by establishing a number of non-consumptive zones in areas that are experiencing conflict between consumptive and non-consumptive uses and in areas that are experiencing significant population or habitat declines;
- eliminate injury to critical/sensitive habitats;
- prevent heavy concentrations of uses that degrade Sanctuary resources;
- provide undisturbed monitoring sites for research activities by setting areas aside for scientific research, monitoring, and restoration;
- provide control sites to help determine the effects of human activities on resources; and
- disperse concentrated harvests of marine organisms.

## **Discussion of Zones**

The following is a discussion of the expected environmental and socioeconomic consequences of the zone types established for the Sanctuary in this Final Management Plan. A longer discussion of the environmental consequences is contained in Volume II, which remains relevant to the final preferred alternative, and an expanded discussion of the socioeconomic consequences is contained in Appendix M, Volume III. The zone types are:

**Wildlife Management Areas.** These zones include areas that are of critical importance to wildlife, especially birds and threatened or endangered species. There are 27 such zones established in the Final Plan. Most of these areas include the waters adjacent to small islands located along the chain of approximately 1500 islands in the Florida Keys. The majority of these areas (20) fall under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) and Sanctuary regulations have been established to complement the USFWS criminal sanctions with Sanctuary civil penalties. Public access restrictions in these areas include idle speed only/no wake, no access buffer, no motor, and closed.

NOAA has mostly retained the Preferred Alternative in the Draft Plan for the Wildlife Management Areas, with only a few minor changes. As a result, consistent with existing USFWS regulations, access to Jewfish Creek and Steamboat Creek in the Crocodile Lake Wildlife Management Area is not restricted. See Volume II Preferred Alternative and Impact analysis. Public comments indicated fishermen and others regularly transit this area. This revision should result in minimal loss of environmental benefits, while not restricting boat traffic through the area, thus avoiding socioeconomic impact on the public's use of these creeks.

Additionally, the Final Plan includes one additional area over what was proposed in the Preferred Alternative of the Draft Management Plan (DMP/EIS, Vol. I). An idle speed only/no wake zone has been established in the area of Lake Surprise east of the US 1 highway that crosses Lake Surprise. This zone was established to protect the endangered American Crocodiles and West Indian Manatees that inhabit the area. This restriction will result in a greater level of environmental protection for these endangered species at a low socioeconomic cost. The eastern portion of Lake Surprise currently has low levels of use. A restriction on boat speeds will not halt the public's current fishing use of the area, but may extend time of transit.

In comparison to the other Draft Alternatives for this zone type, the Final Alternative has considerably higher environmental benefits over Alternative IV in the DMP/EIS (Volume II, page 136), which only included the 19 areas that are currently managed by the USFWS, and fewer environmental benefits than the 37 areas proposed in Alternative II of the DMP/EIS (Volume II, page 138). Since the Sanctuary Advisory Council recommendations were largely adopted in the Draft Preferred Alternative, it is understandable that the proposed WMAs in the draft plan did not receive much public comment during the public review process.

NOAA has taken action to establish these areas because of its mandates under the NMSA and the FKNMSPA and the level of public concern raised on issues involving threats to wildlife in the Florida Keys during its scoping process in 1991. NOAA and the USFWS worked very closely during the development of the management plan to complement each other's interest in protecting the wildlife resources of the Florida Keys, both inside the National Wildlife Refuges, as well as outside.

***Ecological Reserves (formerly Replenishment Reserves).*** In the Draft Preferred Alternative this zone type was called Replenishment Reserves, and NOAA has changed the name to reflect public concerns over the purpose of these areas. The main purpose of Ecological Reserves is to maintain a natural assemblage of living resources in the Sanctuary by setting aside areas to assure minimal human disturbance. Nowhere in the Florida Keys has a complete component of the coral reef ecosystem been set aside from human disturbance. Ecological Reserves will give resource managers and the public an opportunity to have a cross-section of the coral reef community, including the nearshore mangrove fringe, hardbottoms, patch reefs, seagrass beds, mid-channel reef, and the offshore coral reef tract where they can experience the marine inhabitants in an almost natural state. These zones will serve to protect and enhance the spawning, nursery or permanent resident areas of fish and other marine life. Hundreds of marine species are not protected by any form of management and the Ecological Reserves will provide protection and allow areas to return to their natural state. These areas will additionally protect the food and home of commercially and recreationally important species of marine life. This zone type, when properly implemented, will result in long term environmental benefit to Sanctuary resources. There will be some short-term economic costs to fishermen and divers that harvest marine life and who are displaced. However, the

Ecological Reserves constitute a small percentage of the overall marine community of the Sanctuary (under 3%) and NOAA has redrawn the zoning boundaries to minimize such costs (i.e. deleted Key Largo ER and delayed Dry Tortugas ER). As one benefit of maintaining the biodiversity of these areas, it is expected that the long-term benefits to fishermen from the increased productivity in the reserves will be positive. There will be spillover of larvae and adult fish to surrounding areas and an "edge effect" which has occurred in other marine reserves will provide excellent fishing along the boundaries of the reserve. The benefits to non-consumptive users of the Ecological Reserves also will be strongly positive as they will have areas in which they can view, photograph, and enjoy restored coral reef communities and habitats, swarming with large fish and minimal human damage to the coral and other coral reef resources. See Appendix M, Volume III for an expanded discussion of the socioeconomic benefits and costs of these areas.

All activities that do not result in removal of marine life or damage to the resources will be allowed in these areas. Spearfishing, shell collecting, tropical fish collecting, and other activities that result in the harvest of marine life by divers and snorkelers, and fishing activities will be prohibited in this zone type. In addition, direct physical impact to corals in these areas will be restricted.

This zone type has received the most revisions from the Draft Preferred Alternative to the Final Management Plan as compared to other zone types. Three Ecological Reserves were proposed in the draft plan. NOAA has eliminated one of these proposed reserves, maintained the proposed boundaries of another, and delayed action on the third for two years after the final plan is implemented in order to minimize the socioeconomic impact on fishermen. In the Final Management Plan NOAA has developed a final preferred alternative for Ecological Reserves that ranges between the No Action Alternative V and the Least Restrictive Alternative IV contained in the DMP/EIS (Volume II, page 136) by reducing the number of Ecological Reserves in the Final Management Plan. The proposed Ecological Reserves contained in Alternative IV of the DMP/EIS were the same number, but geographically smaller than those contained in the Draft Preferred Alternative III. The more restrictive Alternative II in the DMP/EIS contained eight Ecological Reserves that provided greater biogeographic coverage than the other draft alternatives.

In weighing the additional environmental benefits against the economic and social impacts on commercial and recreational users of the Key Largo Ecological Reserve, NOAA has eliminated that Reserve from the final plan and regulations. The resource protection provided by the existing protected areas, John Pennkamp Coral Reef State Park and the Key Largo National Marine Sanctuary contributed to this decision. Many prohibitions already exist in these areas, on activities such as spearfishing, tropical fish collecting, shell collecting, wire fish trapping, trawling, and the removal of any marine life by divers except for spiny lobster. Establishing an Ecological Reserve in these areas would have resulted in few additional environmental benefits. The full environmental benefit of the protection provided by Ecological Reserves will best be monitored and observed in areas where these harvesting activities are currently conducted. NOAA has taken this into consideration when considering the revisions from the Draft Preferred Alternative to the Final Plan.

NOAA has maintained the boundary that was proposed in the Draft Preferred Alternative for the Western Sambo's Ecological Reserve. High environmental benefits will be gained by protecting this important portion of the coral reef environment. Although there will be positive environmental and socioeconomic benefits to groups such as divers, snorkelers, and glass-bottom boat operators, there will be some socioeconomic costs to fishermen due to displacement from the area. This Ecological Reserve is located adjacent to public property (Boca Chica Naval Airstation) and contains all the habitats that are typically found in an onshore/offshore cross-section of the Keys coral reef environment. Nearshore hardbottom habitats, beautiful inshore patch reefs, seagrass beds, some of the most diverse mid-channel reef, offshore patch reefs, and one of the Keys' best remaining spur and groove bank reefs help comprise this special area. Some of the best remaining coral formations and some of the best remaining water quality occur there. These qualities will help contribute to the success of this area as an Ecological Reserve and will aid NOAA in its mandate to "protect and preserve living and other resources of the Florida Keys marine environment (FKNMSPA, 1990)."

In the DMP/EIS, NOAA proposed boundaries for the Dry Tortugas Ecological Reserve. The north-south configuration of the proposed reserve, which was oriented primarily east of the Dry Tortugas National Park, received considerable public comment, particularly from fishermen. Many commentators suggested there would be little environmental benefits as

compared to the significant adverse socioeconomic impacts which would result from implementation of the no-take regulations within the proposed boundary of the reserve. Shrimpers, lobster fishermen, spearfishermen, and hook and line fishermen testified that a substantial part of their fishing takes place within the proposed reserve. Recommendations ranged from eliminating the reserve entirely to reconfiguring the boundary of the reserve to minimize such impacts. A large number of citizens, scientists, and environmental groups commented that the Dry Tortugas would be a good location for an Ecological Reserve and wanted an area at least the size of that proposed in the draft Preferred Alternative designated. Some were as specific as to recommend a boundary to the west of the Dry Tortugas National Park, incorporating at least some of the National Park. The best coral reef habitats and communities lie to the western half of the Dry Tortugas Bank. By establishing an Ecological Reserve to the west, NOAA would be able to maximize the protection of important coral reef habitat. The National Park boundary does not include some of the ecologically important intermediate to deep reef habitats in the vicinity. An Ecological Reserve in this area is anticipated to have very positive environmental consequences. Water circulation in the Dry Tortugas, due to extensive counterclockwise gyres (Volume II, Affected Environment), will help entrain planktonic larvae for long periods of time, providing new marine life stock along the reef tract as the larvae settle to the bottom.

NOAA did not finalize the implementation of the Dry Tortugas ER in the regulations. Instead, NOAA will postpone final implementation of the boundary and regulations of the Dry Tortugas ER until it undertakes a process, in coordination with the National Park Service, to identify an appropriate final boundary for the Reserve, which will include portions of the Dry Tortugas National Park. To identify the final boundary, NOAA and the National Park Service will use the information gathered as part of the public review of the draft management plan, and hold workshops with users, agency representatives, environmental organizations and the public. Prior to making a final decision, the proposed final boundary of the Dry Tortugas Ecological Reserve will be published for public comment. In summary, while a number of comments supported Alternative III in the draft, the final is between V and IV in order to avoid or minimize socioeconomic impacts on fishermen.

**Sanctuary Preservation Areas.** These areas will protect shallow, heavily used coral reef communities where conflicts often occur between user groups.

The majority of these shallow reef habitats are scattered along the outer reef tract and are the coral reefs most frequently visited by snorkelers and divers. These areas, critical for sustaining important marine species and habitats, are the component of the coral reef ecosystem most vulnerable to direct human impact (e.g. anchor damage, boating impact, diver and snorkeler impacts, concentrated harvest by divers, and damage done by inexperienced fishermen) and indirect from water pollution impacts. All activities that do not result in removal of marine life or damage to the resources will be allowed in these areas. Activities that will be prohibited in the Sanctuary Preservation Areas (SPA's) include spearfishing, shell collecting, tropical fish collecting, fishing and other activities that result in the harvest of marine life by divers, snorkelers, and fishermen. In addition, direct physical impact to corals in these areas will be restricted.

In this Final Management Plan NOAA is implementing all of the SPAs that were proposed in the Draft Preferred Alternative (19) with the exception of the one for Western Sambos Reef. Since that reef is designated an Ecological Reserve, which has the same restrictions as the SPAs, NOAA eliminated this duplicate protection. A total of 18 SPAs are contained in the Final Plan. This will provide the same level of protection that was proposed for the Preferred Alternative in the DMP/EIS, except in the Carysfort SPA. Since NOAA has removed the Key Largo Ecological Reserve from the final plan, the SPA around Carysfort has been enlarged to encompass more of the coral reef community, including patch reefs, coral rubble areas, and intermediate reef habitat, the site of a known grouper spawning aggregation. The size of the SPA will only be expanded by one-half (1/2) of a square nautical mile over the proposed SPA. The more-restrictive alternative (II) in the DMP/EIS also proposed 18 SPAs, but some of them were considerably larger in size, and were not recommended by the Sanctuary Advisory Council (SAC) for the draft preferred alternative because of their greater socioeconomic consequences on the community. The 13 SPAs contained in the less-restrictive (IV) alternative of the DMP/EIS were determined not to be adequate to protect critical coral reefs.

The environmental benefits of this zoning type will be high because direct harvest and physical impacts to the heaviest used component of the coral reef ecosystem, the shallow coral reefs, will be lessened. According to data from an aerial survey (1994, FDEP and TNC work in progress), approximately 80% to 85% of the snorkelers and divers in the Florida Keys

use the 18 SPAs during the year. Although the SPAs are small in size, they capture most of the snorkeling and diving use except during the opening of lobster season. Protecting these areas will have high long-term environmental benefits on the coral reef habitat and positive socioeconomic benefits to the local economy.

There will be a low socioeconomic impact on fishermen from prohibiting fishing in these areas. In the same aerial census cited above, it was determined that over 94% of the boats less than 30' in length fished outside the SPAs. Over 92% of the boats greater than 30' in length fished outside these areas. However, NOAA received considerable public comment on the draft plan (see comments and responses Appendix L, Volume III) regarding baitfishing activities in the shallow reef habitat. NOAA has revised the management plan and regulations to allow limited baitfishing in the SPAs rather than reduce the number of SPAs. NOAA will give permits for the netting of ballyhoo for bait in these areas and does not feel this activity will compromise the overall objective of the SPAs.

In another effort to reduce socioeconomic impacts from the SPAs, NOAA has modified the management plan and regulations to allow catch and release fishing by trolling in four of the Sanctuary Preservation Areas: Conch Reef, Alligator Reef, Sombrero Key, and Sand Key. This should avoid or minimize the socioeconomic impacts on these fishermen. This will also give NOAA areas with which to compare and contrast catch and release SPAs with those where no fishing takes place. These areas were selected on the basis of public comment and data from the aerial surveys. This will help NOAA assess the environmental costs of allowing this activity and the socioeconomic impacts of prohibiting it in the other SPAs.

During the preparation of the Draft MP/EIS commercial fishermen working with Sanctuary planners produced maps that demonstrated the shallow coral reef habitat was not critical to their activity, and since they are not heavily used by commercial fishermen and are relatively small, the socioeconomic impact on commercial fishermen is expected to be low to negligible. There were no negative comments from commercial fishermen, except baitfishermen, regarding the number or location of the SPAs.

Approximately 29 shallow reefs along the reef tract are named on NOAA navigational charts. NOAA has established 16 of these shallow coral reef communities as SPAs, protecting over 55% of this particular

type of shallow coral reef habitat in the Keys. Each of the SPAs encompass a variety of marine habitats including: coral reefs; rubble ridges; backreefs; seagrass; hardbottoms; and coral rubble. All of these habitats are important components of the coral reef community. The ecological benefits of protecting these types of habitats from harvesting activities has been documented in the Looe Key National Marine Sanctuary (Clark, et al, 1989). The SPAs designated in this Final Plan are predicted to have the same kind of successful results as those at Looe Key NMS.

**Existing Management Areas.** This is a simple acknowledgment of existing protected areas in the Sanctuary. These are zones that are currently managed by other agencies, and where regulations already exist. Out of the total 21 existing management zones, 15 are administered by the State of Florida Department of Environmental Protection, 4 by the Fish and Wildlife Service, and 2 by NOAA. Managing these areas within the Sanctuary may require additional regulations or restrictions to provide complete resource protection. These additional management needs will be developed in cooperation with the relevant agency and will be implemented with those agencies.

There are little or no anticipated socioeconomic impacts by establishing these zones since they are currently managed by other agencies. The availability of civil penalties may have some impact to violators. NOAA has included all of the same areas that were included in the Draft Preferred Alternative contained in the DMP/EIS. However, by coordinating management activities and programs with other agencies, such as in the case of the Wildlife Management Areas, where NOAA is coordinating with the USFWS, there will be increased environmental benefits by providing coordinated management. There will also be socioeconomic benefits by saving taxpayers money through sharing of human and material resources and coordinating various management programs such as education, research and monitoring, and resource protection.

**Special Use Areas.** These zones address special use activities and concerns within the Sanctuary, and may be established for education, science, restoration, monitoring, or research. Activities in these areas will be conducted by permit only.

There are only four special use areas in the Final Management Plan: Conch Reef, Tennessee Reef, Looe Key (patch reef), and Eastern Sambos Reef. These are all designated as research-only and NOAA has included all the same research-only areas

that were contained in the Draft Preferred Alternative, with one change. Due to the consideration of socioeconomic impact described by the public during the review process, NOAA has eliminated the Pelican Shoal research-only Special-use Area and replaced it with the Eastern Sambos research-only, Special-use Area suggested by the state in its comments on the DMP/EIS. This change will provide a better research and monitoring site, while simultaneously lessening the socioeconomic impact to the public that would have occurred by limiting access to the reef around Pelican Shoal. However, in order to complement the State's seasonal closure of the land area, NOAA has designated a no-access 50 yard buffer around the island between April 1 and August 31. These dates coincide with those established by the Florida Game and Freshwater Fish Commission for this area.

The long-term environmental benefits of these areas will be strongly positive because they will allow managers to compare and contrast shallow coral reefs that are used by divers and snorkelers with those that are not used by these groups. An excellent example is an intended comparison study of the health of the coral reef at Eastern Sambos (research only site) with the coral reef at Western Sambos where diving and snorkeling is conducted. Both of these reefs are located in similar water quality conditions and they are in approximately the same physical and biological condition. These sites can then be compared to Tennessee Reef and Alligator Reef, which are located in an area that is exposed to poorer water quality. The results of such studies will benefit Sanctuary management. Diving, snorkeling, fishing, and other such recreational and commercial activities will not be allowed in these research-only areas except by scientific or educational permit.

There is also a possibility of establishing Special-use areas in the future for restoration, following some event which damages the resources. The environmental benefits of having these areas are high, whereas the socioeconomic impacts will be low due to their small size. Altogether, these four areas comprise less than one square nautical mile in size.

## **Sanctuary Management: How the Process Works**

In practical terms, the implementation of Sanctuary management is already underway. On September 15, 1992, the Florida Trustees (the Governor and Cabinet) entered into an agreement with the administrator of NOAA to establish a mechanism for the cooperative development of the management plan as well as the cooperative interim management of the Sanctuary while the comprehensive plan was being developed. This interim management agreement provided for the development of several protocols on various cooperative management issues and ultimately provided the direction for the development of the memorandums of agreement and protocols included in Appendix J in Volume III: Draft Inter-agency Compact Agreement for the Integrated Management of the Florida Keys National Marine Sanctuary, Co-trustees Agreement, Submerged Cultural Resources Agreement, Law Enforcement Agreement, Natural Resources Damages/Civil Claims Agreement, Protocol for Cooperative Fisheries Management, Protocol for Emergency Response Notification, Permitting/Certifications Agreement, Water Quality Protection Plan Agreement, and Navigational Aids Agreement.

In the interim management agreement there were several provisions concerning jurisdiction and authority of the State as a result of Sanctuary designation.

Education programs have been implemented Sanctuary wide, research and monitoring programs have expanded Sanctuary wide, and various elements of the water quality protection program have been implemented throughout the Sanctuary. In addition, boat groundings are being responded to, the NMSA and the FKNMSPA are being enforced, and some cross-deputization of enforcement personnel has occurred. Many of the strategies included in the Final Alternative represent actions that will be carried out by either State or local agencies, with or without the cooperation of the Federal government. However, the important difference between these independent actions and the process of management outlined in this document is the degree of integration, coordination, and cooperation that must be applied. Achieving the long- and short-term goals for this unique region requires the development of a close and continuing partnership among all the agencies serving the residents of, and visitors to, the Keys. To this end, the existing management structure must be modified.

The FKNMSPA mandates the development of a comprehensive management plan that represents a major departure from the nation's traditional approach to marine resource management. NOAA is committed to coordinating with other Federal, State, and local agencies in a continuous management process. This process is designed to balance the demands of the many activities in the region, and to ensure the long-term protection of the resources that make the area unique. This requires the cooperation of many institutions that historically have not been focused on the same goals. Because of the complexity of managing the activities and resources in the Keys, no single agency or institution can effectively meet the goals of the Act designating the Sanctuary. Overlapping jurisdictions, different agency objectives, limited fiscal resources, and other problems point to the necessity of developing a management program that brings together multiple institutions for the common purpose of protecting this important area. The framework outlined in this chapter allows and encourages these institutions and the public to participate in the decision-making process.

The basic elements of the continuous management process are shown in Figure 3. The foundation for this process is the signing of an Interagency Compact Agreement (Volume III, Appendix J) formalizing Federal, State, and local government agency support for the Sanctuary. The elements necessary for successful implementation of the Management Plan focus on the Interagency Group, the Resource Management Team, the Sanctuary Advisory Council, and various Standing Committees. This management arrangement makes it possible for Ad Hoc Partnership Groups to be formed as committees that will provide input to the Management Team.

The details of the management process described in this document are the starting point for discussions between the parties that must cooperate to manage the Sanctuary. Subsequent negotiations between the responsible agencies may alter the framework, but its primary feature, the extensive amount of cooperation and integration of effort between and among these governmental and non-governmental bodies, must and will remain.

## The Management Plan

The FKNMS Management Plan is the result of a cooperative effort among Federal, State, and local agencies and institutions. A significant amount of public, non-governmental organization (NGO), and user community input has been included in the development of this Plan. A set of actions is identified that will be implemented based on the continuous management process. Approval of the Plan by the participating agencies of the Interagency Compact Agreement is a prerequisite for successful management of the Sanctuary.

## The Compact Agreement

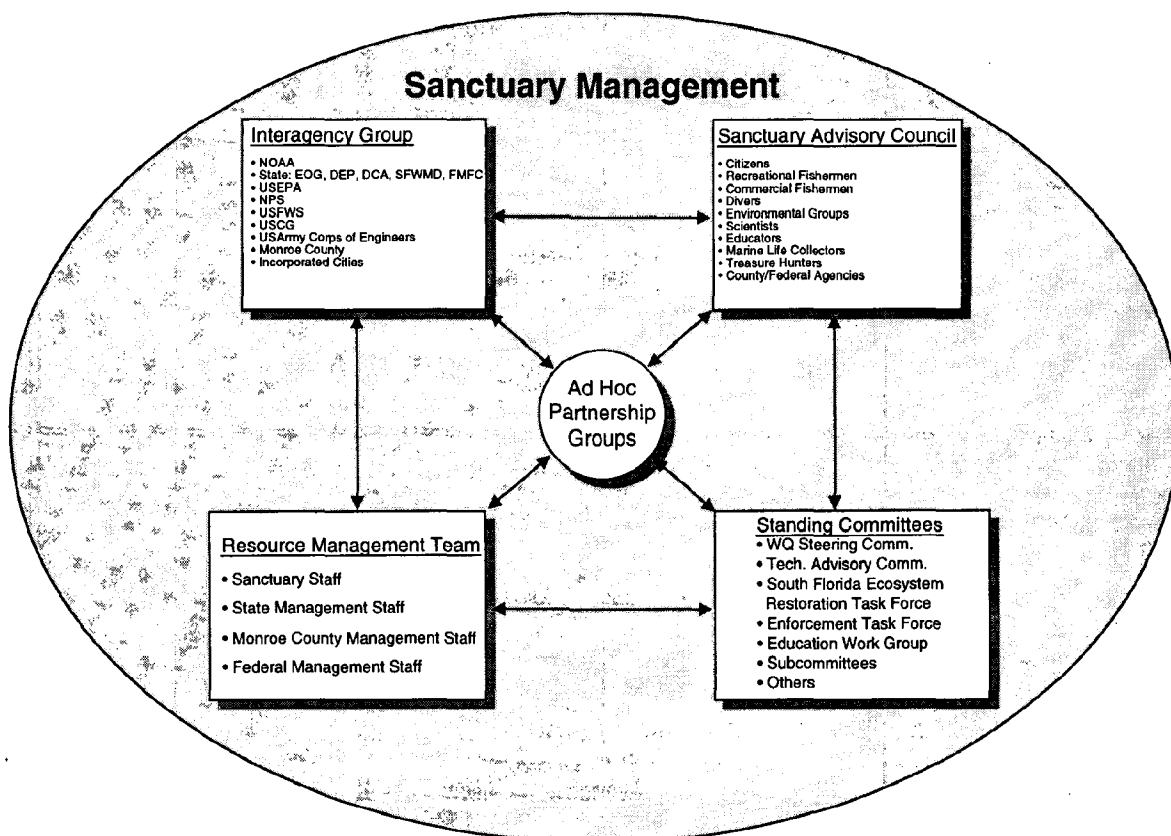
The FKNMSPA requires that NOAA coordinate with the appropriate Federal, State, and local agencies to support implementation of the Management Plan. The Interagency Compact Agreement officially joins the parties under the umbrella of this Plan. The provisions of the Draft Compact are included in this Final Management Plan (Volume III, Appendix J).

The Compact establishes a formal commitment to the management of the Sanctuary. This commitment is critical to ensuring full participation and cooperation from the many institutions that play a role in the successful management of the Sanctuary. Since State lands and waters make up the majority of the Sanctuary, the participation of State and local agencies is considered critical to providing a holistic ecosystem approach to management.

The Compact forms the foundation for subsequent interagency and intergovernmental cooperative agreements, protocols, and other less formal interagency work efforts. The signing of this Compact signals that the cooperative and integrated management approach established for this Sanctuary has been adopted.

The Compact reflects the Federal/State co-trustee management of the region's resources, reiterating the goals of the Act designating the Sanctuary. This will ensure that the work conducted by EPA as part of the Water Quality Protection Program is clearly connected to the overall management of the Sanctuary.

Figure 3. Continuous Management: How the Process Works



## **Cooperative Agreements**

In order to formally implement cooperative management of the Florida Keys National Marine Sanctuary, a number of separate cooperative agreements must be entered into among the various governmental agencies and entities with cross jurisdictional and trustee interest in resource protection (Volume III, Appendix J). The following identifies the nature and purpose of prospective agreements:

**Co-trustees Agreement** - Establish, by way of a Memorandum of Agreement, the relative jurisdictional interests, management authorities, and conditions in State- and Federally-owned lands and resources as they pertain to the Sanctuary, agreeing to the cooperative management and enforcement of certain laws and regulations as they pertain to management of the Sanctuary, and generally adopting and agreeing to the integrated management approach for implementation of the sanctuary management plan.

Signatories: NOAA Administrator and Governor and Cabinet, as Florida Trustees.

### **Submerged Cultural Resources Agreement**

Establish protocols, procedures and regulations for the comprehensive management of historical resources throughout the Sanctuary consistent with the National Marine Sanctuary Act, the Abandoned Shipwreck Act, AS Guidelines, and State laws and procedures.

Signatories: NOAA Administrator and the State of Florida, Secretary of State.

**Cooperative Enforcement Agreement** - Establish protocols, procedures and identify training needs to coordinate operational enforcement in the Sanctuary and cross-deputization of Federal/State/local law enforcement officers to expand enforcement capabilities under Sanctuary Act and other NOAA statutes. Signatories: NOAA, Florida Marine Patrol, Florida Park Service, NMFS, U.S. Coast Guard, National Park Service, and U.S. Fish & Wildlife.

### **Agreement for the Coordination of Civil Claims**

Establish protocols and procedures for notification and response to incidents involving injury, damage or loss of Sanctuary resources and the coordination of joint initiation and conduct of civil action and claims to remedy injury and recovery.

Signatories: NOAA and Governor and Cabinet, or designated cotrustees.

### **Protocol for Cooperative Fisheries Management**

Establish protocol for the unified and cooperative State/Federal management of fishery resources within the Sanctuary, including a process for promulgation of consistent fishing regulations.

Signatories: Florida Marine Fisheries Commission, South Atlantic and Gulf of Mexico Fishery Management Councils, National Marine Fisheries Service, National Ocean Service.

### **Protocol for Emergency Response Notification**

Establish operational protocol to ensure coordination and cooperation between sanctuary management and other Federal, State and local authorities with jurisdiction within or adjacent to the Sanctuary regarding notification, response and action taken in response to boat groundings and other physical damage to sanctuary resources. Cross reference to other emergency protocols, i.e. Oil Spills, will be included.

Signatories: NOAA; Department of Environmental Protection; Monroe County; U.S. Coast Guard; Nat. Park Service; U.S. Fish & Wildlife Service.

### **Sanctuary Certification and Permitting Agreement**

Establish a procedure and protocol for interagency coordination and review of activities (leases, licenses, permits, approvals or other authorizations) which are specifically prohibited and/or may affect resources within the Sanctuary. Existing procedures and protocols will be considered in this agreement process. No new rules or governmental structures will be required. Signatories: NOAA, Director, Office of Ocean and Coastal Resource Management; Florida Department of Environmental Regulation, Secretary; South Florida Water Management District, Governing Board.

### **Water Quality Protection Program Steering Committee By-laws**

Establish an agreement of understanding among the agencies and governmental entities associated with the Florida Keys Water Quality Protection Plan regarding implementation strategies and funding of programs. The By-Laws and Charter of the Water Quality Protection Plan Steering Committee will be used for this agreement. Signatories: U. S. Environmental Protection Agency, Region IV Administrator; U.S. Coast Guard, Commandant; Florida Department of Environmental Protection, Secretary; South Florida Water Management District, Governing Board; Florida Department of Health and Rehabilitative Services, Secretary; Monroe County, Board of County Commissioners.



**Navigational Aids Agreement** - Establish a working group and a formal protocol and process for developing and implementing consistent marking and signage of channels and special use areas within and adjacent to the Sanctuary.

Signatories: NOAA; U.S. Fish and Wildlife Service; National Park Service; U.S. Coast Guard; U.S. Army Corps of Engineers; Florida Department of Environmental Protection; Florida Department of Community Affairs; Monroe County, Department of Marine Resources. This agreement has not been initiated.

### **The Management Team**

The "overall" Management Team is comprised of an Interagency Group and a larger field staff level Resource Management Team, including Sanctuary staff. The Management Team represents agencies actively involved in some aspect of resource management in the Florida Keys. This Team will identify and recommend action items for the Federal, State, and local managing agencies to be implemented in the Sanctuary. One or more advisory councils will provide input to this process from the user perspective.

#### **Interagency Group**

The Interagency Group is comprised of agency staff representatives with statutory or direct responsibilities for Management Plan development and implementation. The agencies represented on this Interagency Group are those that have agreed to enter into the continuing integrated resource management process by signing the Interagency Compact Agreement. Their representatives have been involved in the development of the Draft Management Plan and continuous management process. The Interagency Group will meet at least two times per year. In addition, at least one public meeting of the entire Management Team, together with the Sanctuary Advisory Council, will be conducted to communicate the current status of management activities in the Sanctuary. The Interagency Group will assist in implementation of the management plan in a variety of ways: (1) by reviewing and commenting on the progress of management programs; (2) by identifying potential funding and personnel resources needed to implement programs; and (3) coordinating the development of policies at the national, state, and local levels with those identified in the management plan.

#### **Resource Management Team**

The Resource Management Team consists of representatives of Federal, State, regional, and local government agencies, and Sanctuary staff at the field level. These members are the field resource managers for the various agencies that are currently involved in resource management programs such as resource protection, science, and education. Examples of membership would include refuge managers, park managers, preserve managers, state lands managers, heads of agency science programs, and other local agency resource managers. This group will be established by a charter agreement or MOA. Team members will play an important role in continued cooperation between agencies by communicating relevant information on Sanctuary activities within their agency's internal management structures. This Team will be responsible for carrying out the various integrated management programs within the Sanctuary. They will be responsible for identifying new goals and objectives and raising any new issues or problems as they develop.

The Resource Management Team will communicate closely with the Interagency Group, the Sanctuary Advisory Council, and various Standing Committees to assure successful implementation of the Sanctuary Management Plan and the Water Quality Protection Program.

#### **Sanctuary Advisory Council**

The FKNMSPA and NMSA authorized the establishment of a Sanctuary Advisory Council (SAC) to assist NOAA in developing and implementing this Sanctuary Management Plan. Council participants represent conservation groups, public interest groups, local industry representatives, academia, commercial and recreational user groups, and the general public. The role of the Sanctuary Advisory Council is to provide recommendations to the Resource Management Team on Sanctuary management needs. The SAC will serve to identify gaps in Sanctuary management as well as serve in the capacity of liaisons to the community regarding Sanctuary issues. The SAC will also serve as the community's liaison to the Resource Management Team regarding the impact of implementation on the public and the public's interest in management needs. The SAC will serve to assist in resolving difficult and controversial issues in the Sanctuary by providing their expertise and advice in recommendations to the Resource Management Team and Sanctuary staff. The SAC will also serve as the local communities' liaison to the Resource Management

Team regarding the impact on the public of management implementation and their concerns about management. Members of the SAC will be asked to sit on Ad Hoc Partnership Groups and serve on various Standing Committees to assist in the implementation of the management plan and identification of Sanctuary management needs.

#### **Ad Hoc Partnership Groups**

The Ad Hoc Partnership Groups will be committees formed on a temporary basis to handle immediate Sanctuary management needs. These groups will be formed on an as needed basis to assist the Inter-agency Group, the Resource Management Team, the SAC, or any of the Standing Committees on specific tasks or projects. The membership of these groups may include members from any of the other groups, or outside experts asked to address a specific topic. For example, under the Permit MOA, an Ad Hoc group may be formed to coordinate multiple Federal, State, and local permits for large projects which are likely to affect Sanctuary resources. Another example is, under the Protocol for Fisheries Management, an Ad Hoc group may be formed to coordinate the management of fisheries in the Sanctuary by the South Atlantic Fishery Management Council, Gulf of Mexico Fishery Management Council, the Florida Marine Patrol, and the US Coast Guard. Chairs of these groups will be appointed at the time of their formation.

#### **The South Florida Ecosystem Restoration Task Force**

The South Florida Ecosystem Restoration Task Force (SFERTF) (Volume III, Appendix B) was established through an Interagency Agreement signed on September 23, 1993. The Task Force was established to "coordinate the development of consistent policies, strategies, plans, programs, and priorities for addressing the environmental concerns of the South Florida ecosystem." The Task Force created a Management and Coordination Working Group (The Working Group) to annually formulate and recommend to the Task Force management policies, strategies, plans, programs, and priorities for ecosystem restoration and maintenance. The efforts of the Working Group are facilitated and better integrated through the work of four Subgroups including: science; management; infrastructure; and public information and education. The Florida Keys National Marine Sanctuary has been identified as the downstream component of the South Florida ecosystem and for that reason management activities between the SFERTF and the Resource Manage-

ment Team must be integrated to the greatest extent possible.

The memberships of the Interagency Task Force, Working Group, and Subgroups includes federal, state agencies, the Seminole Tribe of Florida, and the Miccosukee Tribe. Memberships of these groups overlap with the various groups identified for the Continuous Management Process of the Sanctuary. This overlap, especially in the subgroups, should facilitate the integration and implementation of the priorities established by the SFERTF with those of the Sanctuary.

#### **Water Quality Protection Program Steering Committee**

The FKNMSPA directed the U.S. Environmental Protection Agency (EPA) and the State of Florida, in consultation with NOAA, to develop a Water Quality Protection Program for the Florida Keys National Marine Sanctuary. The purpose of the Water Quality Protection Program is to "recommend priority corrective actions and compliance schedules addressing point and non-point sources of pollution to restore and maintain the chemical, physical, and biological integrity of the Sanctuary including restoration and maintenance of a balanced, indigenous population of corals, shellfish, fish, and wildlife, and recreational activities in and on the water." In addition to corrective actions, the Act also requires development of a water quality monitoring program and provision of opportunities for public participation in all aspects of developing and implementing the program.

Membership of the committee shall include representatives of the Environmental Protection Agency, National Park Service, U.S. Fish and Wildlife Service, Army Corps of Engineers, NOAA, Florida Department of Community Affairs, Florida Department of Environmental Protection, South Florida Water Management District, Florida Keys Aqueduct Authority, three individuals in local government in the Florida Keys, and three citizens knowledgeable about the Program. The Regional Director of EPA and the Florida Department of Environmental Protection serve as Co-chairs of the Steering Committee. The Director of NOAA's Office of Ocean and Coastal Resource Management is a committee member and ensures integration of the water quality program with the other Sanctuary management programs.

## Implementation Costs

An integrated management approach involves many Federal, State, and local agencies that have a stake in the long-term health of the Sanctuary. Consequently, the total costs for managing the Sanctuary are to be shared by the participating Federal, State, and local agencies and may be further supported by private efforts, including NGOs. Table 3 presents the estimated annual operation and maintenance costs for implementing the Management Plan. The costs presented are for management of the Sanctuary and do not reflect costs to improve water quality in the Florida Keys. These costs are significant and are summarized in the Water Quality Action Plan and are explained in more detail in the Phase II document of the Water Quality Protection Program.

### Current and Potential Funding Sources

Limited resources are currently available for full implementation of all the management actions outlined in the Preferred Alternative. Existing sources of financing will have to be supplemented if significantly more management activities are to be undertaken. Potential sources of additional funding are described in the following paragraphs.

Table 3. *Estimated Annual Operation and Maintenance Costs for Implementing the Management Plan*

Program Area	Cost (million dollars)
Administration	0.90
Channel Marking	0.60
Education	0.50
Enforcement	1.40
Mooring Buoy	1.00
Research and Monitoring	1.06
Submerged Cultural Resources	0.08
Volunteer	0.06
Zoning	1.00
<b>Total</b>	<b>6.60</b>

**Sanctuary Operation Funds.** The Sanctuary is managed jointly by NOAA's National Marine Sanctuary Program and Florida's Bureau of Coastal and Aquatic Managed Areas. Operating funds for Sanctuary management come from Federal appropriations to the National Marine Sanctuary Program. Operating funds cover expenses such as personnel salaries, boat maintenance, property rental, equipment and supplies, etc.

**State of Florida.** The State has ongoing resource protection, management, and permit programs that carry out Sanctuary objectives. State funding directed toward Sanctuary management could be increased and/or focused on activities identified in the Action Plans. For example, the State has provided funding to the Sanctuary Education Program on various projects, such as "Coral Reef Classroom" and "Team OCEAN".

**Nonprofit Organizations.** The Sanctuary has participated in cooperative projects with nonprofit organizations in which each party contributed partial funding. For example, the Sanctuary and The Nature Conservancy cooperatively support a program to recruit and organize volunteers to perform tasks that benefit the goals of the Sanctuary.

**Foundations.** NOAA's Sanctuaries and Reserves Division has been working with the National Fish and Wildlife Foundation (NFWF) to develop collaborative efforts to increase the visibility and accessibility of the National Marine Sanctuary Program. The NFWF operates by awarding challenge grants to match private-sector funds, often generating double- or triple-match cooperative projects. Sanctuary supporters in the Keys have established a Florida Keys Sanctuary Friends group to support Sanctuary programs and products. Similar foundations have been established in conjunction with national estuarine research reserves around the country.

**Damage Assessment and Restoration Revolving Fund.** Section 312 of the National Marine Sanctuaries Act (NMSA) authorizes NOAA to pursue civil actions to recover response costs and damages for incidents that injure, destroy, or cause the loss of Sanctuary resources. Since fiscal year 1991, funds collected by NOAA under Section 312 have been deposited in the Damage Assessment and Restoration Revolving Fund (DARRF). Section 312(c) requires that 20 percent of recovered damages, up to a maximum balance of \$750,000, be used to finance response actions and damage assessments. The remaining damages are to be spent, in priority order, to: 1) restore, replace, or acquire the equivalent of the injured Sanctuary resources; 2) manage and improve the affected national marine sanctuary; and 3) manage and improve any other national marine sanctuary. The Florida/NOAA MOA for Coordination of Civil Claims Based on Injuries to Sanctuary Resources addresses the use of recovered sums to restore damaged resources consistent with Section 312. The strict criteria on the use of these Section 312 funds precludes expenditures for management purposes until other obligations for these funds are

met. These monies collected for Section 312 actions are not considered revenue generating funds because of the emphasis on directing the monies back to restoring the damaged resources.

**Civil Penalty.** Under Section 307(c) of the NMSA, NOAA can assess a maximum civil penalty of up to \$100,000 per day per violation of the NMSA or any regulation or permit issued under the statute. While this maximum authority is ample for egregious destruction of coral and other significant Sanctuary resources, most civil penalties for routine resource violations in the existing Key Largo and Looe Key NMS have been comparable to those collected by other agencies for similar infractions. The statute provides that funds are to be used, in priority order, to: 1) manage and improve the sanctuary within which the violation occurred; 2) pay a reward for information leading to a civil penalty or forfeiture action; and 3) manage and improve any other sanctuary. Under the Interim Management MOA and the Co-trustee Agreement, NOAA has agreed that any monetary recovery of civil penalties be used to remedy injury to Sanctuary resources for the exclusive benefit of the Florida Keys National Marine Sanctuary.

**FKNMS License Plate Funds.** An initiative is underway to introduce legislation setting up a specialty automobile license plate with a "Save the Coral Reef Tract" theme. Fees from Florida residents who purchase the license plate would go toward a fund dedicated to supporting reef protection activities. "Manatee" and "Florida Panther" license plates, made available in 1990, have generated \$1 million to \$2 million per year.

**Boating Improvement Fund.** The fund is administered by Monroe County and is derived from a portion of state vessel registration fees which are returned to the county where they are generated. The fund must be used for projects designed to enhance boating, and is specifically targeted at channel marking, launching facilities, and similar projects. Currently, Monroe County receives approximately \$125,000 annually from this source; consequently, this is money that exists and is already being applied to channel marking needs in the Sanctuary.

**South Florida Ecosystem Restoration.** The South Florida Ecosystem Restoration Task Force (SFERTF) (Volume III, Appendix B) was established through an Interagency Agreement signed on September 23, 1993. The Task Force was established to "coordinate the development of consistent policies, strategies, plans, programs, and priorities

for addressing the environmental concerns of the South Florida ecosystem." Part of the Task Force's responsibilities are to obtain funding for the restoration of the South Florida ecosystem including the Florida Keys National Marine Sanctuary. Potential funding sources that may be used for Sanctuary management and water quality improvements include the 1996 Farm Bill, highway toll collections, and monies earmarked for particular agencies through the Federal appropriations process for the restoration efforts in the South Florida ecosystem.

# Action Plans

## Introduction

The following chapters include the 10 Sanctuary action plans that outline the process for implementing Management Plan strategies. Action plans are composed of bundles of management strategies sharing common management objectives, and present the initial outline of the steps required for implementation. They provide an organized structure and process for implementing management strategies, including a description of the activities required, institutions involved, and requirements necessary for either complete or partial implementation. Although the plans are comprehensive, more detailed information about the tasks required must be developed for each strategy prior to implementation.

**Action Plan Organization.** All action plans are organized in three sections: 1) an introduction; 2) a description of strategies in the plan; and 3) a strategy implementation schedule. The introduction summarizes the goals and objectives of the plan and presents an overview of all strategies to be implemented. The description section lists the strategies and their component activities. Each activity is a sub-component of the overall strategy, and represents a specific management action(s). The implementation section summarizes the requirements (e.g., funding, costs, personnel, etc.) needed to implement the strategies in each action plan.

**Action Plan Specifics.** The *Research and Monitoring* and *Water Quality* action plans address requirements mandated in the Florida Keys National Marine Sanctuary and Protection Act (FKNMSPA). In addition, the National Marine Sanctuary Program traditionally has *Education and Outreach*, *Enforcement*, and *Volunteer* programs at each sanctuary. The *Channel/Reef Marking*, *Mooring Buoy*, *Submerged Cultural Resources* and *Zoning* plans outline specific actions that will be taken to protect Sanctuary resources. The *Regulatory* plan includes the Sanctuary regulations and explains how management strategies have been incorporated into the regulations.

**Limitations.** Action plans provide only preliminary implementation and funding guidelines, and their parameters may change in the future. They present only the *planned* actions considered necessary to address the range of issues and problems confronting the Sanctuary. Their primary limitation is that strategies are expected to change with the evolution

of the Sanctuary Program. Because the information in the action plans represents only the initial steps of implementation, the development of more-detailed information is still necessary.

Another limitation relates to the timing, cost, funding, and personnel requirements for each plan. This information is estimated and expressed in ranges, as more detailed information cannot be provided, given the uncertainties in the planning stage at this time. These estimates must be refined closer to the time of strategy implementation. This implementation is usually dependent on a coordinated mix of Federal, State, and local institutions, and many of these joint efforts will require memoranda of agreement and/or understanding among the cooperating agencies.

Although the thrust of what must occur to implement most strategies should already be identified in the action plans, they do not include all of the information required for complete implementation. Detailed information about the tasks, resource requirements, and agreements necessary to implement each strategy must still be developed. The Sanctuary staff and institutions providing assistance must develop the more detailed information required for such implementation to be successful.

**Action Plan Development.** Action plans were developed as a means of implementing management strategies recommended by the Core Group, Strategy Working Group, and Advisory Council. Topics were initially identified by NOAA and the Sanctuary Core Group, and were then assigned to professionals with expert knowledge about their specific theme (e.g., education, zoning, etc.). These professionals developed the draft text for the plans, and this text was reviewed by NOAA. The revised drafts were submitted to the Core Group members and peer reviewers for additional comments, and this information was incorporated into the plans found in this document. The paragraphs below describe the action plan development process in more detail.

**Strategy Identification.** The first step in developing action plans was to identify the strategies that would make up each plan. The 98 strategies in Alternative III were analyzed by the action plan authors and the Core Group to determine the appropriate mix of strategies in each plan. The objective was to place strategies in plans according to their management thrust. For example, all strategies that included specific educational activities were included in the Education and Outreach Action Plan. Strategies

requiring research and monitoring were included in that plan. Table 1 lists the strategies in each action plan.

**Strategies in Multiple Plans.** Due to the complexity of many strategies, some were included in more than one action plan. For example, a strategy may appear in both the Education and Outreach Plan and the Volunteer Plan, with each plan detailing the implementation procedure for the appropriate component of the strategy. The Printed Materials strategy, for example, includes both educational and volunteer components.

Other strategies, however, were exactly the same in multiple plans (e.g., many strategies in the Research and Monitoring Plan are the same as those in the Water Quality Action Plan). Where this is the case, a complete strategy description is included in only one plan, and that description is referred to when the strategy is mentioned in other plans.

**Developing Background Information for Strategy Implementation.** For each strategy within each action plan, information was developed regarding a number of parameters affecting strategy implementation. For example, information on the timing of implementation, costs, and currently available funding was compiled. This information was developed at planning workshops, and by the action plan authors, the Core Group, and peer reviewers. For each plan, information was developed for the parameters listed below.

**Strategy Prioritization.** Management strategies were organized into three groups (referred to as priority levels high, medium, and low in the action plans and action plan summaries) based on their relative importance or implementation feasibility. Because of the large number of strategies and the limited resources available, prioritization was necessary to determine the timing of strategy implementation. Initially, action plan authors identified "high-priority" strategies for their respective plans, and the list of these strategies was revised by the Core Group.

**Planned Level of Activity in Year 1.** Each strategy and activity has been assigned an estimated "activity level" (high, medium, low, or none) for year 1, and this information is included in each action plan. Activity levels represent the anticipated level of action in the first year following the adoption of the Sanctuary Management Plan.

**Months to Complete Strategy.** This is the estimated number of months required to complete each strategy or activity. If a strategy is expected to continue

indefinitely, the number of months required to complete its main thrust is identified and it is listed as a continuous strategy. Although it would be useful to list a detailed milestone-type schedule for each strategy (i.e., defining when a strategy will begin and end), the uncertainties involved in implementing such a large number of strategies limit realistic scheduling to listing the number of months required for completion.

**Funding.** This is the level of funding currently available from all sources (Federal, State, local, and private) to complete each strategy. Because costs are not clearly defined, and the number of institutions that will be involved in funding activities may change, this is a subjective estimate based on expert knowledge (i.e., action plan authors and the Core Group). Funding-level estimates are provided for four availability categories: less than 50 percent; 50 to 74 percent; 75 to 99 percent; and 100 percent.

**Costs.** Estimates have been developed for each strategy and component activity for total capital costs and annual operations and maintenance costs. Costs are given in ranges and, when possible, are listed at the activity (strategy component) level within each action plan.

- Capital costs include the purchase of equipment (boats, vehicles, etc.), construction of buildings and plants, land acquisition, and other start-up expenses.
- Operations and maintenance costs include salaries, travel expenses, rent, utilities, upkeep, supplies (fuel, paper, etc.), and other administrative expenses. All cost estimates are listed in ranges.

**Geographic Focus.** The geographic focus of a strategy or activity. Management actions may be Sanctuary-wide, or limited to a specific area such as the Upper, Middle, or Lower Keys.

**Personnel.** The number of personnel required to implement the strategy or component activity. Estimates of staff requirements are listed in ranges.

**Strategies Not Included in Action Plans.** Nineteen strategies were not placed in action plans (excluding the Volunteer Action Plan), as they were not considered to fit within any plan. However, one strategy (B.10: Damage Assessment) was considered important enough to be a high-priority strategy (to be implemented in year 1). Based on its importance, the Sanctuary Superintendent will be responsible for ensuring that this strategy is fully implemented.

# Channel/Reef Marking Action Plan

***This action plan describes the strategies used to develop and implement a comprehensive channel/reef marking plan for the Sanctuary. The two strategies in the plan are derived from Alternative III, the most balanced of the management alternatives. The strategies are described in terms of their component activities. For each strategy/component activity, the time required for implementation, funding availability, costs, and responsible agencies/organizations are outlined. Table 4 summarizes key information about the strategies included in this plan.***

## Introduction

The strategies in this action plan are designed to establish an effective channel/reef marking system for boaters within the Sanctuary. Although Channel Marking is already in place in selected areas, considerable resource damage is occurring in areas lacking these navigational aids. The plan will establish a standardized system of signage that will be utilized throughout the Sanctuary, and will establish the priorities for channel/reef marker placement (emphasizing long-term protection and the enhancement of impacted shallow-water resources).

Marking the reefs as well as the entrance and exit areas and the major accessways to and from Florida Bay, the Gulf of Mexico, and the Atlantic Ocean will minimize the damage done to shallow-water resources throughout the Sanctuary. In addition, action plan implementation will facilitate enforcement action against damaging effects that are the result of inappropriate boater activities.

It is assumed that additional channel/reef marking in well-defined and prioritized locations will reduce the damage to shallow-water resources. A number of preliminary assessments must be completed before a

recommendation about additional marking is made. Several inventories will be conducted to assess current shallow-water resource damage, the location of all existing markers (permitted and unpermitted), the location and function of all marine facilities, and depth of the entrance and exit channels from Keys subdivisions. In addition, tests of the premise that marking may increase boat traffic will need to be completed. Changes in boating activity will have to be monitored as new marking systems are placed in sensitive areas.

Although much of the work described in this action plan was completed by early 1994, these activities have been included in the plan to provide a complete description of the channel/reef marking requirements. In addition, those activities that have already been completed are identified. Overall, the Channel/Reef Marking Program should ultimately become a maintenance program, and will be a continuous component of the Sanctuary management process.

**How the Plan is Organized.** This plan outlines the approach for developing and implementing a Sanctuary-wide channel/reef marking scheme. The plan is based on the management strategies in Alternative III, and outlines the steps necessary to create an effective Channel/Reef Marking Program within the Sanctuary. The plan is composed of two strategies and their component activities, and is organized in three parts: an introduction, description of strategies, and a discussion of implementation considerations.

## Background

**Management Strategies.** Each strategy in the Action Plan has been assigned an estimated activity level for year 1 (high, medium, low, or none) which represents an estimate of the planned level of action that

**Table 4. Summary of Channel Marking Strategies**

Page	Strategies	Overall Sanctuary Priority Level <sup>+</sup>	Planned Level of Action in Year 1	Months to Complete	Funding for Full Implementation	Number of Activities to be Undertaken	Number of Institutions
47	<b>Channel Marking Program</b>						
47 B.1	Boat Access Survey <sup>1</sup>	*	—	0	75-99%	5	2
48 B.4	Channel Marking	High	High	60+	75-99%	10	8

<sup>+</sup> Strategies with an "\*" for Overall Sanctuary Priority Level are already existing programs and/or will be completed in the first year of sanctuary operation.

<sup>1</sup> Much of this strategy will be completed prior to year 1, however, it includes an activity that will continue indefinitely.

will occur in the year after the Sanctuary management plan is adopted. In addition, the time required for implementation, costs of implementation, and available funding (Federal, State, local, and private) have been estimated for each strategy. The component activities in each strategy, and the institutions responsible for implementing these activities, have been identified as well.

The strategies for the Management Plan, which includes the channel/reef marking Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the Sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Channel/reef marking Strategies.** The Boat Access (B.1) strategy is completed, as outlined below, except for the continued update and maintenance of the database and GIS layer developed as the result of completing activities in this strategy. The channel/reef marking strategy (B.4) is included in priority level 1. Portions of this strategy have been completed, while some activities are ongoing.

**Relationship to Other Action Plans.** The regulations associated with the channel/reef marking strategy are included in the Regulatory Action Plan. Anticipated volunteer assistance is described in the Volunteer Action Plan. Also, while the Boat Access strategy is included as a component of the Mooring Buoy Action Plan, the implementation scheme (description of activities and associated information) for the strategy is only included in this action plan.

## Goals and Objectives

**National Goals.** The need for channel/reef marking in the Sanctuary is unique within the National Marine Sanctuary Program. The Sanctuary contains broad shallow-water areas and significant reef tract that require channel/reef marking for adequate resource protection. Still, the implementation of a channel/reef marking Plan is based on the more general national goal of resource protection and the provision of

reasonable and appropriate public access to the resource. The channel/reef marking Action Plan has been developed with these goals in mind.

**Sanctuary Goals.** The Sanctuary is affected greatly by broad spatial resource impacts, with a substantial proportion comprised of shallow benthic resources in waters affected by constant use. A main Sanctuary goal is the protection of these shallow areas by various means, including an extensive and well-managed Channel/Reef Marking Program. Sanctuary goals with respect to channel/reef marking include:

- protecting and improving degraded shallow-water resources;
- providing reasonable and appropriate public access while minimizing resource damage; and
- educating the public about what has been done to protect the resource and what they can do by becoming better boaters.

**Program Objectives.** To achieve these goals, the following objectives must be accomplished:

- assess the characteristics of boat use within the Sanctuary;
- assess the extent and intensity of damage that has occurred due to prop dredging;
- develop a standardized channel/reef marking system for the Sanctuary;
- develop channel/reef marking criteria that provide maximum protection to Sanctuary resources, ensure reasonable boating access, and allow for easy transit within the Sanctuary;
- gain agency and user consensus on the channel/reef marking criteria;
- implement a plan for installing new markers; and
- educate the public about the Channel/Reef Marking Program.



## Description of Strategies

### Channel Marking

The Channel/Reef Marking Program is comprised of two strategies. The Boat Access strategy (B.1) has been completed and has generated information about the location of existing marine facilities in the Keys and this data has been incorporated into a geographic information system (GIS) that will be maintained by the State. The GIS will be updated based on changes in facilities and newly issued permits. The channel/reef marking strategy (B.4) contains 10 activities. The first seven activities are largely complete and have provided the information necessary to assess need, prioritize and implement channel/reef marking. The other three will establish the process for developing a comprehensive Channel/Reef Marking Program. Activities 8 and 9 are underway.

#### Channel Marking Strategies

##### B.1: Boat Access

- Acquire existing information
- Develop and carry out boat access survey
- Input survey data to a GIS
- Make survey results available to resource managers
- Update survey results

##### B.4: Channel Marking

- Survey current boat travel patterns
- Survey boater use
- Survey damage from prop dredging
- Inventory and georeference channel markers
- Survey subdivisions for shallow-water access
- Assess channel marking effectiveness
- Integrate data
- Organize channel marking program
- Implement channel marking program
- Develop channel marker maintenance program

### Strategy B.1: Boat Access

Conduct a survey to assess public and private boat access throughout the Sanctuary.  
(Completed prior to Year 1)

**Activity 1-Acquire Existing Information.** Obtain information about the location of existing marine facilities in the Keys. Sources should be broad, and may include local comprehensive plans, permit data from Federal, State, and local agencies, and previously conducted surveys.

■ **Existing Program Implementation.** The Monroe County Department of Marine Resources (DMR) and the Florida Marine Research Institute (FMRI) of the Florida Department of Environmental Protection (FDEP) have already completed this activity.

■ **Implementation.** This activity was implemented by the FMRI and the Monroe County DMR.

■ **Schedule.** This activity was completed prior to year 1.

**Activity 2-Develop and Carry Out Boat Access Survey.** Develop a data sheet to characterize each marine facility, and carry out a ground survey of each boat access site in the Keys. The sheet should include the precise location (local address and global positioning system (GPS) coordinates), type of facility, services provided, and intensity and type of use (recreational, commercial, live-aboard).

■ **Existing Program Implementation.** The FMRI and Monroe County DMR have completed this activity.

■ **Implementation.** This activity was implemented by the FMRI and Monroe County DMR.

■ **Schedule.** This activity was completed prior to year 1.

**Activity 3-Input Survey Data into a GIS.** Input all data developed through the on-site survey into a GIS database.

■ **Existing Program Implementation.** Monroe County DMR and the FMRI have completed this activity.

■ **Implementation.** The Monroe County DMR was responsible for completing this activity under contract with the FMRI. All data has been turned over to the FMRI and will be updated by the Monroe County DMR as marine facilities change or new ones come into existence.

■ **Schedule.** This activity was completed prior to year 1.

**Activity 4-Make Survey Results Available to Resource Managers.** Initiate a process to make the

### *Action Plans: Channel/Reef Marking*

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information developed in the marine facilities survey available to resource managers in map, graphic, and written form.

■**Existing Program Implementation.** This activity is ongoing. Data is currently available through the FMRI. As part of FMRI's obligation to maintain data created as a result of activities carried out in the Sanctuary, this information will become more readily available over time. See Strategy W.28 in the Water Quality Action Plan.

■**Implementation.** The FMRI will be the lead agency responsible for implementing this activity. NOAA will assist in implementation.

■**Schedule.** This activity is ongoing as part of Strategy W.28 in the Water Quality Action Plan.

**Activity 5-Update Survey Results.** Update the marine facilities GIS database as facilities change and new ones are permitted.

■**Implementation.** The FMRI will be the lead agency responsible for implementing this activity. This activity should become a continuous process, with the Monroe County DMR providing primary support.

■**Schedule.** This activity will continue indefinitely.

***This strategy is also included in the Volunteer Action Plan.***

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### **Strategy B.4.: Channel/reef marking**

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Establish a channel/waterway marking system throughout the Sanctuary. (High Priority Level, High Level of Action in Year 1, Five years to Complete, 75-99% Funding Available for Full Implementation)

This strategy is comprised of a number of ongoing projects whose purposes may be broader than the scope of the channel/reef marking strategy. However, the information made available through these projects will assist in the development of this strategy. These projects are listed as individual activities within this plan.

**Activity 1-Survey Current Boat Travel Patterns.** This survey was designed to determine the typical routes of travel used by all segments of the public within the Sanctuary. The survey included information about how participants believe channel/reef

marking could be improved to facilitate their ability to travel, while minimizing potential damage to Sanctuary resources. All information collected will be entered into both a State and county GIS.

■**Existing Program Implementation.** Public meetings were held in 1992 to gather information about current travel routes. The survey was completed and the results confirmed in September 1993.

■**Implementation.** The Monroe County DMR had the lead responsibility for implementing this activity. The FMRI will provide a primary role in implementation by providing GIS assistance.

■**Schedule.** This activity was completed prior to year 1 and required two months to complete.

**Activity 2-Survey Boater Use.** This survey was designed to define the spatial and temporal patterns of boat use within the Sanctuary. It involved weekly overflights in a prescribed pattern along the Sanctuary's north/south boundaries from Soldier Key to the Marquesas. Boat counts were made during these flights, and each identified boat was assigned spatially to a one-minute grid. The overflights were coupled with simultaneous on-water surveys to enable clearer definition of specific boater activities at the time of each overflight. All data derived from this survey has been entered into a GIS.

■**Existing Program Implementation.** The overflights were initiated in late summer 1992 and continued through late summer 1993.

■**Implementation.** The FMRI had the lead responsibility for implementing this activity, and NOAA provided primary support. The Nature Conservancy assisted with implementation.

■**Schedule.** This activity was completed prior to year 1. The overflights required 12 months to complete. Work on the data at the FMRI lasted through 1995.

**Activity 3-Survey Damage from Prop Dredging.** The prop dredge survey was designed to determine the distribution and extent of damages to shallow-water resources in the Sanctuary that have resulted from boating activities.

■**Existing Program Implementation.** The survey has already been conducted using existing aerial photography and overflights of selected areas. Field work began in summer 1992 and was completed by January 1993. Information from the survey has been incorporated into the FMRI GIS. A summary report

was provided to FMRI in early 1993 to describe survey results. This information is now available on the FMRI, GIS and in FMRI Technical Report TR-1.

■**Implementation.** The FMRI had the lead responsibility for implementing this activity.

■**Schedule.** This activity was completed prior to year 1. It required nine months to complete the field survey work. The Technical Report was made available in 1995.

**Activity 4-Inventory and Georeference Channel Markers.** The channel marker inventory was designed to identify all known markers, and characterize and georeference them. Information gathered has been incorporated into a GIS. The survey will allow for an assessment of where new markers may be advantageous, will help determine where markers may be repositioned. The survey allowed the Monroe County DMR to identify the location of unpermitted markers and will help them determine if they should be removed. A relatively good database on permitted markers currently exists. However, prior to the completion of this survey, only anecdotal information was available for unpermitted markers.

■**Implementation.** Monroe County had the lead responsibility for implementing this activity. NOAA, the FMRI, and the U.S. Coast Guard (USCG) assisted with implementation.

■**Schedule.** This activity was completed prior to year 1. It required twelve months to complete.

**Activity 5-Survey Subdivisions for Shallow-water Access.** This survey was designed to complete an assessment of water depths at subdivision entrance points, and of shallow-water impediments between the Atlantic Ocean, Florida Bay, and the Gulf of Mexico and subdivision entrances. The information collected will be used to prioritize the placement of corrective or additional marking.

■**Implementation.** Monroe County had the lead responsibility for implementing this activity. The FMRI and the Florida Department of Community Affairs (FDCA) provided primary support.

■**Schedule.** This activity was completed prior to year 1. It was carried out at the same time as the channel marker survey and required twelve months to complete.

**Activity 6-Assess channel/reef marking Effectiveness.** This activity will establish two very important

components of the Action Plan: 1) baseline photogrammetric (aerial photography) information for assessing changes in benthic communities in discrete areas following the establishment of the Channel/Reef Marking Program; and 2) baseline data for evaluating possible changes in boater use of an area which result from the installation of channel markers. The project will assess the effectiveness of various channel/reef marking methods to reduce shallow-water resource damage over time. It is anticipated that additional overflights will be completed each year for at least five years after new markers are installed so that resource managers can assess changes in prop scarred areas over time. Before and after surveys of boater use on various channels will also help to assess whether channel/reef marking increases the number and size of vessels using an area. Additional methods (e.g., on-site monitoring) for evaluating the effectiveness of the channel/reef marking effort will be used as the program is implemented.

■**Existing Program Implementation.** Five areas have already had aerial overflights completed. These are the north end of Big Coppitt Key, Lower Sugarloaf Sound, Kemp Channel south of U.S. Highway 1, the north end of Ramrod Key and the Lignum Vitae Aquatic Preserve area. Two of these areas, Lower Sugarloaf Sound and the Lignumvitae area, received channel/reef marking.

■**Implementation.** The Monroe County DMR will have the lead responsibility for implementing this activity, and the FMRI will provide technical and financial support.

■**Schedule.** This activity will be an ongoing part of the Channel/Reef Marking Program and will be completed in an effort to assess the effectiveness of channel/reef marking in each individual area marked.

**Activity 7-Integrate Data.** Virtually all of the information collected through the first five activities will be included in a GIS.

■**Implementation.** The FMRI and the Monroe County DMR had the lead responsibility for implementing this activity.

■**Schedule.** This activity was completed prior to year 1. It required 30 months to complete.

**Activity 8-Organize Channel/Reef Marking Program.** This activity will be implemented to develop the process for marking channels. A channel/reef marking Working Group (CMWG) composed of represen-

tatives from NOAA, Fish and Wildlife Service (FWS), National Park Service (NPS), U.S. Army Corps of Engineers (USACE), USCG, FDEP and FDCA, and the Monroe County DMR was established in 1993 to coordinate this activity. As a result, preliminary channel/reef marking criteria were developed in 1994. Citizen and user groups will also be asked to participate to assist the CMWG in refining the channel/reef marking criteria. The CMWG will be responsible for: 1) developing a joint statement of jurisdiction; 2) defining the typical conditions under which channel markers will be used; 3) recommending new types of signage for use in the shallow waters of the Keys, subject to approval by the U.S. Coast Guard; 4) continuing to develop the criteria for assessing the need for marking; 5) developing the list of potential locations for channel markers; 6) developing the criteria for prioritizing the order of importance for new channel marker installation; and 7) evaluating the need to remove channel/reef markers which are found to have a detrimental effect on shallow water communities. The 1994 Draft channel/reef marking Prioritization Criteria are provided in Table 5. The criteria are designed to emphasize the use of markers to eliminate documented damage where boat use is already established, rather than improving access to less frequented areas.

■**Implementation.** Through the CMWG, NOAA and Monroe County will take the lead responsibility for convening the agencies responsible for permitting and placing channel markers in the Sanctuary. In order to facilitate an accelerated and comprehensive program that meets the resource management goals of the Sanctuary, both agencies will work to coordinate and streamline the permitting process. This will include a consensus building effort designed to evaluate and come to terms with differences in resource management priorities in the wildlife refuges of the Lower Florida Keys. The FMRI will provide primary technical support. All aids to navigation must be approved by the USCG.

■**Schedule.** This activity will be completed by early 1997. It will require twelve months to complete. It is anticipated that the Monroe County DMR will receive grant funding to continue the development of the channel/reef marking Plan. This funding should allow for the completion of this activity and part of Activity 10.

**Activity 9-Implement Channel/Reef Marking Program.** Based on the information developed in the previous activities, channel/reef marking will be implemented. This activity consists of four components: 1) establishing funding sources and develop-

ing an implementation time frame based on current and projected funding allocations; 2) establishing implementation responsibilities; 3) submitting and reviewing permit applications based on the review of the CMWG recommendations; 4) installing the channel markers; and 5) removing channel/reef markers when necessary.

■**Existing Program Implementation.** Monroe County receives funding from the State of Florida through the Boating Improvement Fund (BIF). This fund is derived from State vessel registration fees, a portion of which is returned to the county where the fees were generated. In 1995, Monroe County received approximately \$125,000 from the BIF. This money must be used for boating improvement activities, including channel markers. Monroe County has been active in sponsoring channel/reef marking projects utilizing this funding source. Projects originate with the Monroe County DMR and require review and approval by the Marine and Port Advisory Committee (MPAC) and the Board of County Commissioners. It is also possible for Monroe County to draft an ordinance which would allow the County to levy an additional 50 percent of the State's portion of vessel registration fees. For example, for a vessel 26 feet in length or less, the State's portion of the registration fee is \$18.50. Thus, an additional \$9.25 could be levied directly by the county. Such an ordinance would provide, at a minimum, an additional \$200,000 per year to the County for boating improvement needs such as channel/reef marking. At current (1995) rates, if the County allocated 75% of the BIF to channel/reef marking, approximately 100 channel markers could be installed annually. Up to 250 to 300 markers could be installed annually if the ordinance were passed. A conservative estimate of the number of new markers required is in the range of 500 to 1,000.

■**Implementation.** The Monroe County DMR will have the lead responsibility for implementing this activity. The Florida DEP, the U.S. ACOE and the USCG will serve a primary role by reviewing permit applications for all aids to navigation. Monroe County will install the majority of the channel markers. All aids to navigation must be approved by the USCG.

■**Schedule.** Implementation will begin prior to year 1. The permitting and marking components of this activity will be continuous. At a minimum, the project would last four years based on full monetary commitment. It could last as long as 10 years. In the first two years more time would be spent in developing permit applications and in attaining permits. In subsequent years, a greater proportion of time allocation would

go to channel marker installation. A goal of the program is to mark 15 high priority channels over four years.

**Activity 10-Develop Channel Marker Maintenance Program.** A marker maintenance program will be developed and implemented to ensure the upkeep of channel markers. A major component of this process will include the development of a GIS database for the permitted markers.

■*Implementation.* The Monroe County DMR will have the lead responsibility for implementing this activity.

■*Schedule.* Development of the activity will require six+ months to complete. Actual on the water maintenance will be a continuous obligation.

***This strategy is also included in the Regulatory and Volunteer action plans.***

Table 5. Channel/Reef Marking Prioritization Criteria

Prioritization Criteria	Points
Severity of impact at damaged area is identified as exhibiting a.	
High level of impact	50
Medium level of impact	25
Low level of impact	0
(based on FMRI Technical Report TR-1 (1995))	
Damaged area is	
Large in area (>25 acres)	50
Medium in area (>10 acres, but, < 25 acres)	25
Small in area (<10 acres)	0
(based on GIS area calculation)	
Note. Consideration will be given to provide for adding areas that this process of prioritization may have missed (e.g., small areas that have high levels of damage severity). Such areas might only need a single marker to solve a problem.	
Damage does not appear to be primarily the result of a random act having nothing to do with purposeful travel from place to place	10
Damage does not appear to be primarily the result of developing new routes (As short cuts, for intrusion into new areas, or, as the result of new shoreline commercial or residential development)	10
Damage does not appear to be the result of the use of inappropriate draft vessels	10
Route which contains damaged area or route leading to a damaged area does not transit near sandy beach areas which are known sites of turtle nesting. (Based on documentation from Save A Turtle, FWS, FGFWFC, or Everglades/Dry Tortugas NPS)	10
Damaged area or route leading through a damaged area is not within an area noted for special management in the FWS Back Country Management Plan	10
The damaged area or the travel route of which it is part do not transit other managed areas which provide any limitations on vessel type, travel characteristics or impacts on wildlife which result from the act of transit	10
The damaged area is not in or immediately adjacent to an area critical for bird, nesting roosting, or foraging (As defined by the FWS, FGFWFC, or Everglades NPS)	10
The damaged area or the travel route of which it is a part will not significantly impact the Manatee (based on documented boat strikes)	
Damaged area is on a common travel route (based on historic use and volume of traffic). If "Yes," then	10
Common route has no reasonable alternatives.	10
Level of traffic is estimated to be	
High	10
Medium	5
Low	1
Note. This criterion is subjective, intended to provide marking for heavily utilized areas. Assessment should be made based on qualitative comparisons of the numbers of boats using other areas.	
Damage exists because the route is narrow, circuitous, or otherwise difficult to "read"	10
Route is entirely in deep water (greater than 4 feet MLW)	10
Route does contain areas that are shallow (less than 4 feet MLW).	5
Route is entirely in waters of less than 4 feet MLW.	-5
The Channel/Reef Marking can be limited to the identified damaged area (e.g., creates a better route at specific area of damage or hinders short cutting at that location)	10
The route already has legally permitted markers along the majority of its length. If "Yes," then, Some existing markers are poorly placed, OR	10
Additional markers are needed to clarify the best route	10
There are other damaged areas prioritized for marking along the same route	10
<b>SUM</b>	
The sum serves to rank each damaged area for completion of marking. Damaged areas receiving the highest values would be marked first.	

## Implementation

This section explains how the strategies in the channel/reef marking Action Plan will be implemented. The institutions responsible for each activity, and those agencies that will provide some level of assistance, are identified. The strategies are also ranked to indicate their overall priority level. In addition, the planned level of activity in year 1, months required to complete, funding availability, cost estimates, staff requirements, and the geographic focus of each strategy/activity are provided. Finally, the process used to evaluate the effectiveness of the Channel/Reef Marking Program as it evolves over time is provided.

**Responsible Institutions.** The Monroe County DMR will have the primary responsibility for implementing the activities within this action plan. However, the success of the Channel/Reef Marking Program will depend on the cooperation of other Federal, State, and local agencies, primarily the FMRI and FDEP, USCG, and NOAA. The channel/reef marking Working Group will also play an important role in strategy implementation. Table 6 lists the institutions responsible for implementing each activity.

**Prioritization of Implementation.** The channel/reef marking strategy is a high priority level, and is considered one of the sixteen most important strategies in the Management Plan. Since the Boat Access strategy is essentially complete, it has not been assigned a priority level.

Table 6. Agencies/Organizations Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies/Organizations						
	NOAA	USACE	USCG	FDEP (ERP)	FMRI (FDEP)	FDCA	DMR
<b>CHANNEL MARKING PROGRAM</b>							
<b>B.1 Boat Access Survey</b>							
Acquire Existing Information				●			
Develop and Carry Out Boat Access Survey							●
Input Survey Data into a GIS				●			
Make Survey Results Available to Resource Managers				●			
Update Survey Results				●			●
<b>B.4 Channel Marking</b>							
Survey Current Boat Travel Patterns				●			●
Survey Boater Use	●			●			○
Survey Damage from Prop Dredging				●			
Inventory and Georeference Channel Markers	○		○	●			●
Survey Subdivisions for Shallow-Water Access				○	●		●
Assess Channel Marking Effectiveness			○	●			●
Integrate Data	●			●			○
Organize Channel Marking Program	●			●			●
Implement Channel Marking Program	●	●	●	●			●
Develop Channel Marker Maintenance Program			●				●

● Lead    ● Primary Role    ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; USACE, U.S. Army Corps of Engineers; USCG, U.S. Coast Guard; FDEP, Florida Department of Environmental Protection; ERP, Environmental Resource Permitting; FMRI, Florida Marine Research Institute; FDCA, Florida Department of Community Affairs; DMR, Monroe County Department of Marine Resources; TNC, The Nature Conservancy.

Table 7. Requirements for Implementation

Strategy/Activity	Overall Sanctuary Priority Level	Implementation			Cost to Complete		Geographic Focus	# of Personnel
		Planned Level of Action in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/ Maint. (\$1,000)		
CHANNEL MARKING PROGRAM								
B.1 Boat Access Survey	AC	AC	AC	75-99%	<10	NC		2
Acquire Existing Information		AC	AC	75-99%	<10	NC	SW	
Develop and Carry Out Boat Access Survey		AC	AC	75-99%	<10	NC	SW	
Input Survey Data into a GIS		AC	AC	75-99%	<10	NC	SW	
Make Survey Results Available to Resource Managers		AC	AC	75-99%	<10	NC	SW	
Update Survey Results		High	C	75-99%	<10	NC	SW	
B.4 Channel/Reef Marking <sup>+</sup>	High	High	60+	75-99%	>5,000	260-600		10
Survey Current Boat Travel Patterns		AC	AC	75-99%	<10	NC	SW	
Survey Boater Use		AC	AC	75-99%	10-99	NC	SW	
Survey Damage from Prop Dredging		AC	AC	75-99%	10-99	NC	SW	
Inventory and Georeference Channel Markers		AC	AC	75-99%	10-99	NC	SW	
Survey Subdivisions for Shallow- Water Access		AC	AC	75-99%	<10	NC	SW	
Assess Channel Marking Effectiveness		High	C	75-99%	10-99	10-99	SW	
Integrate Data		AC	AC	75-99%	<10	NC	SW	
Organize Channel Marking Program		High	12	75-99%	<10	NC	SW	
Implement Channel Marking Program		High	C	<50%	1,000-5,000	250-500	SW	
Develop Channel Marker Maintenance Program		High	C	75-99%	<10	NC	SW	

Abbreviations: Maint., Maintenance; AC, Already Completed; C, Continuous; SW, Sanctuary Wide.

<sup>+</sup>All of the activities, except for implementing channel marking, are currently underway. Some may be completed prior to year 1.

**Schedule.** Table 7 lists the estimated time required to implement each strategy and activity in the Channel/Reef Marking Program. Most activities in the channel/reef marking strategy are expected to be completed in year 1. However, the implementation of this strategy (i.e., installing and maintaining channel markers), will be a continuous process. All activities (excluding updating survey results) in the Boat Access strategy will be completed before year 1. Updating boat survey results will be a continuous component of the Boat Access strategy.

**Cost.** The costs associated with implementing the Channel/Reef Marking Program are expected to be significant (up to \$1 million in total capital costs and an additional \$250,000 for annual operations and maintenance costs). The bulk of these costs are associated with placing and maintaining channel markers throughout the Sanctuary. The estimated cost of each activity is provided in Table 7.

**Geographic Focus.** Both strategies will be implemented Sanctuary-wide.

**Personnel.** About 10 staff members from the Monroe County DMR and the institutions identified in Table 6 will be required to implement the channel/reef marking strategy. Two staff members from the Monroe County DMR have been involved in implementing the Boat Access strategy and will continue to be involved in developing the plan, submitting permit applications, and developing installation and maintenance contracts.

**Contingency Planning for a Changing Budget.** About \$125,000 per year is available from Monroe County Boating Improvement Funds, some aids to navigation will be owned and maintained by the USCG. Although the current level of funding will allow the Program to function, fully implementing the



Channel/Reef Marking Program will require additional funds. As noted previously, sufficient funds would become available immediately if the County were willing to adopt an ordinance to levy additional funds through the state vessel registration fee requirements. The program will be completed; additional funding simply shortens the time frame.

**Evaluating Program Effectiveness and Efficiency.**

The effectiveness of the Channel/Reef Marking Program will be evaluated based on how many proposed markers are installed each year. The program's effectiveness will also be determined based on the success of the process to update the survey information developed through the Program.

# Education and Outreach Action Plan

***This action plan identifies and describes education and outreach strategies that will be implemented in the Florida Keys National Marine Sanctuary. The strategies in the plan are derived from the Preferred Alternative, the most balanced of the management alternatives. For each strategy, the time required for implementation, funding availability, costs, and responsible parties are outlined. All of the 10 strategies will be implemented in the first year of Sanctuary operation. These strategies are expected to have a significant effect on managing, protecting, and preserving both natural and cultural Sanctuary resources. Table 8 summarizes key information about the strategies included in this plan.***

## Introduction

One of the primary mandates of the Florida Keys National Marine Sanctuary and Protection Act (FKNMSPA) is to educate the public about the marine environment surrounding the Keys. The diverse habitats, resources, and unique setting of the Keys offer opportunities for the interpretation of marine subtropical and temperate environments. Educational and outreach strategies in the action plan fall into two general categories: community involvement/community program strategies and product development strategies. The first group includes education and outreach strategies designed as interactive programs for user groups (e.g., exhibit production, training programs, workshops, school

programs, public-involvement forums, and special events). Strategies that result in the development of specific products (i.e., printed materials, audio-visual materials, signs and displays in high-use areas of the Keys, public service announcements, visitor booths/displays, etc.) providing a mechanism for public education and outreach are included in the second group. The education and outreach strategies included in this plan were developed based on input from environmental educators, the Sanctuary education staff, user groups, environmental activists, and concerned citizens through two workshops (May 1988 and September 1991) held in the Keys and through public comment received on the draft management plan. Guidance on levels of activities and priorities was provided by the Sanctuary Advisory Council and the FKNMS Core Working Group.

Education and outreach have been used as a tool in resource protection from the beginning of the Sanctuary Program in the Keys. The Looe Key and Key Largo national marine sanctuaries have used education as an effective management tool since their designation. A number of educational programs are currently underway at the two sanctuaries, and will continue to be implemented in the FKNMS (see inset box Existing Programs). Examples of these programs include instruction to teachers and students about the Sanctuary environment (Coral Reef Classroom), on-site interpretive tours, subject-specific slide programs, interpretive law enforcement, interpretive exhibits at trade shows and festivals, weekly campfire programs, training seminars, and volunteer programs.

**Table 8. Summary of Education and Outreach Strategies**

Page	Strategies	Overall Sanctuary Priority Level	Planned Level of Action in Year 1	Months to Complete	Funding for Full Implementation	Number of Activities to be Undertaken	Number of Institutions
62	<b>Community Involvement/Community Program</b>						
62	E.4 Training, Workshops, and School Programs	High	Medium	12+	<50%	7	19
64	E.6 Advisory Board	High	High	6+	100%	1	12
65	E.10 Public Forum	Medium	Low	12+	<50%	4	14
66	E.11 Special Events	Medium	Low	9+	<50%	5	20
67	E.12 Professional Development						
68	<b>Product Development</b>						
68	E.1 Printed Materials	High	Low	C	<50%	13	18
71	E.2 Audio-Visual Materials	Medium	Low	3+	<50%	2	11
72	E.3 Signs/Displays/Exhibits	Medium	Low	36+	<50%	6	17
74	E.5 PSAs	Medium	Low	60+	<50%	5	13
75	E.7 Promotional/Educational Materials	Medium	Low	48	<50%	2	8

Abbreviations: C, Continuous

**How the Plan is Organized.** This action plan is organized in three sections: an introduction, description of strategies, and discussion of implementation procedures. The introduction summarizes the goals and objectives of the Education and Outreach Program and provides background information on planning efforts. The strategy description section groups strategies according to whether they contain community-involvement or product-development activities. The implementation section details how strategies in the plan will be placed into action. For each strategy and component activity, the priority level, funding availability, costs, and timing of implementation are summarized.

## Background

**Management Strategies.** Each strategy has been assigned an estimated activity level for year 1 (high, medium, low, or none). This activity level is an estimate of the planned level of action that will occur in the first year after the Sanctuary Management Plan is adopted. In addition, the time required, costs of implementation, and funding availability (Federal, State, local, and private) have been estimated for all strategies. The component activities within each strategy, and the institutions responsible for implementation, have also been identified.

The strategies for the Management Plan, which includes the Education and Outreach Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Education and Outreach Strategies.** This action plan includes the 10 strategies in the Preferred Alternative that have an education or outreach component. Although the plan includes many strategies important to Sanctuary protection, the strategies concerning printed materials, training programs, and an advisory board are a high priority with regards to implementation. However, seven of the remaining

strategies are included in medium priority level, and each will have some level of implementation in the first year of Sanctuary operation. Table 8 summarizes the education and outreach strategies and activities within this plan, including Sanctuary priority level, planned level of action in year 1, months to complete, and funding available for full implementation.

**Relationship to Other Action Plans.** In general, all management activities are dependent on successful interpretation and education and outreach. In fact, one can envision an educational and outreach component to all management strategies. The management plan conceptualizes the educational and outreach approach as a primary tool of resource management to help preserve natural marine habitats and submerged cultural resources, with enforcement activities as an additional tool for these purposes. All of the strategies listed in this plan, excluding the establishment of an education advisory board, are also included in the Volunteer Action Plan. The success of Sanctuary educational and outreach strategies is dependent upon the volunteer assistance. The Training, Workshops, and School Programs strategy is also included in the Water Quality Action Plan.

## Goals and Objectives

**National Program Goals.** Marine Sanctuaries are established throughout the country in recognition of a site's unique environmental and/or historical and cultural characteristics. This plan's reference to the environment is intended to include natural as well as historical-cultural resources. Each Sanctuary stands apart as a national treasure, and education, outreach, and interpretation activities regarding the natural resources of these areas is often site-specific. However, there are National Marine Sanctuary Program goals that apply to each Sanctuary that help define the framework for developing site-specific education and outreach activities. The education goals of the National Program include:

- providing educational leadership in marine conservation and protection efforts throughout the nation's national marine sanctuaries and national estuarine research reserves;
- adopting a Sanctuary Program/system-wide unity and identity to promote greater national awareness, while encouraging site-specific individuality;

## Existing Programs

Education and outreach has been a primary source of resource protection in the Florida Keys since the first sanctuary was established in 1975. There are a number of educational and outreach efforts underway at the Key Largo and Looe Key national marine sanctuaries that will continue within the framework of the FKNMS. Some of the more effective educational and outreach programs in the Keys are:

**Coral Reef Classroom.** This training program uses both the Key Largo and Looe Key national marine sanctuaries as *in situ* classrooms where students and teachers are taught about coral reef ecology, Sanctuary management, and coral reef monitoring. Monroe County science/biology students have been provided on-site tours to observe the complexities of the coral reef ecosystem that cannot be gained in the traditional classroom.

**On-Site Interpretive Tours.** Tours within the waters of the existing sanctuaries have provided unique and meaningful educational experiences for participants. These snorkeling trips are usually preceded by a slide program or lecture. Topics of discussion include Sanctuary management, coral reef ecology, research, and natural and human-induced impacts.

**Subject-Specific Slide Programs.** Slide and/or video programs are provided upon request to schools, colleges, special-interest groups, government officials, clubs, etc.

**Interpretive Law Enforcement.** In addition to enforcing Sanctuary regulations, Sanctuary law enforcement officers contact visitors on the water every day, distribut-

ing Sanctuary brochures and providing information. This approach enhances on-site identity, lends a friendly cooperative spirit, increases compliance with Sanctuary regulations, and prevents violations or negative impacts.

**Interpretive Exhibits.** Sanctuary exhibits are often provided at national trade shows/conferences and local community events (i.e., seafood festivals, regional boat shows, and dive shows). These exhibits are usually staffed by Sanctuary personnel.

**Frequent Users Meetings.** These periodic meetings update commercial and recreational users of the Key Largo and Looe Key national marine sanctuaries about current management issues, educational products and programs, research results, and law enforcement concerns.

**Weekly Campfire Programs.** Sanctuary officers provide weekly slide programs at the Bahia Honda State Park during the winter tourist season (November through April).

**Training Seminars.** Sanctuary staff provide seminars on damage assessment techniques, mooring buoy installation, and reef cleanup on a request basis.

**International Training Program.** This program is administered by the National Marine Sanctuary Program and is established for managers and staff of marine protected areas around the world. The training includes instruction and discussion of management strategies, law enforcement, education, research, and facilities maintenance.

- linking the sanctuaries and reserves programs to each other through national environmental education programs, and
- establishing a standard of excellence that is attained through the education programs of all sites.

### Sanctuary Education and Outreach Program

**Goals.** Recognizing the importance of program consistency and the need to attain the standards that will link the programs of the sanctuaries and reserves, goals and objectives have been developed specifically for the FKNMS. These goals are designed to respond to the specific environmental education needs of the Keys' community and Sanctuary visitors/users.

There are three broad (and sometimes overlapping) characterizations of Sanctuary education and outreach program goals and objectives to be considered:

The first set of these are those with desired outcomes for Sanctuary staff and education provider groups. These address staff training and staff development.

The second broad category of goals and objectives addresses learner outcomes, and includes awareness, cognitive knowledge, skill development and participation in stewardship. These outcomes are very much linked to the first set of outcomes.

A final set of outcomes, categorized as Sanctuary outcomes, refers to issues of Sanctuary awareness, management and enforcement. According to these broad characterizations, the Sanctuary Education and Outreach Program goals are as follows:

#### Staff and Education Provider Goals

- facilitating environmental education opportunities for all segments of society, and

- promoting and supporting education and training opportunities for Sanctuary staff and entities providing education programs within the Sanctuary.

**Learner Outcome Goals:**

- promoting a holistic view of the Keys' ecosystem as an interrelated and interdependent system of habitats;
- encouraging and promoting a sense of user stewardship regarding the marine environment by imparting strategies and skills which will help reduce the occurrence and effects of future resource impacts;
- promoting and fostering a clear awareness of the economic, biological, recreational, educational, and cultural values of the Keys' ecosystem, as well as the interdependence of these factors upon one another;
- fostering increased recognition and understanding of:
  1. social and political issues associated with these resource impacts and;
  2. associated management strategies intended to reduce or eliminate such impacts.
- fostering knowledge and understanding of the historical relationships between humans and these ecological systems, with attention to resource impacts, and the limitations of current scientific knowledge.

**Sanctuary Outcome Goals:**

- promoting the awareness of, and support for, the Florida Keys National Marine Sanctuary Program through community partners in education, outreach, awareness, enforcement, and management.

**Sanctuary Education and Outreach Program Objectives**

Because of the Sanctuary's large size and range of management issues, there are many Sanctuary Program objectives that encompass a wide variety of themes. To achieve the goals defined above, the following objectives should be met:

- support, develop, and establish cooperative agreements to promote innovative educational projects regarding the Sanctuary and/or the Keys' marine ecosystem;
- provide and support multi-disciplinary environmental education experiences;
- provide and support training opportunities for resource users;
- utilize the existing network of educators and environmental education organizations and institutions already in place;
- provide orientation and continuing education for FKNMS education staff, officers and others on ways to teach target groups about the resources in the Sanctuary, both at a cognitive and a skill-based level;
- cross reference regulatory and interpretive enforcement in the Education/Outreach Action Plan;
- provide educational opportunities for the educational community, including organizations and agencies delivering environmental, natural historical, cultural, and socio-economic education information, so that they may have access to consistent, accurate scientific information;
- provide mechanisms so that new ideas and policies can be introduced and incorporated into the ongoing Education and Outreach Action Plan; and
- provide permitting mechanisms so that pre-existing education organizations and new entries may carry out their activities within the Sanctuary with minimal processing.

**Learner Outcome Objectives**

- provide the public with information gained through research in a timely fashion;
- provide educational information at technical and scientific meetings;
- provide education for visitors to the Sanctuary;
- provide a cognitive understanding of broad ecosystem interactions as well as a skill-based understanding;

- facilitate specific education for Monroe County youth that emphasizes the interconnectedness of the Keys ecosystem through traveling sequential field trip programs;
- provide education for audiences outside of the Florida Keys (state, national, and international); and
- provide on-site opportunities for resource education.

#### **Sanctuary Outcome Objectives**

- increase NOAA and other organizations' awareness of educational programming activities in the Keys by non-agency organizations;
- increase public awareness of current Sanctuary activities;
- encourage community cooperation and participation in Sanctuary management;
- increase the understanding of, and voluntary compliance with, sanctuary resource management efforts (channel marking, mooring buoys) and regulatory requirements (e.g., zoning regulations);
- provide the public with information gained through research;
- increase public awareness of cumulative environmental impacts in the Keys;
- provide opportunities for individuals to become "caretakers" of the environment;
- provide information at "high-profile" locations;
- provide informative environmental education and outreach programs to school systems;
- provide exposure to environmental education, introducing an ecosystem approach over time;
- provide multilingual environmental education materials and programs; and
- provide environmental education opportunities for adults.

## Description of Strategies

### Community-Involvement/Community-Program Strategies

Education and outreach strategies designed to include opportunities for interaction can be defined as community-involvement/community-program strategies. Examples of activities within these strategies include educational exhibit production, training programs, workshops, school programs, public-involvement forums, and special events. New strategies and/or activities may be added as the program evolves. When possible, all strategies within this category will have a multilingual component, as a concerted effort will be made to communicate environmental education to the non-English-speaking population of South Florida.

#### Strategy E.4: Training/Workshops/School Programs

This strategy will help develop instruction and training opportunities, including programs conducted by teachers, Sanctuary staff, other non-formal educators, and volunteers. Training programs (e.g., Coral Reef Classroom, submerged cultural resources, etc.) will also be provided for teachers, environmental professionals, business owners and operators, and law enforcement officials. These programs will be designed to keep these audiences up-to-date with consistent and accurate scientific information. Key elements of these training opportunities will include: 1) emphasis on an ecosystem approach; and 2) fostering a cognitive knowledge, as well as a skill-based knowledge, of the Key's ecosystem. *(Priority level High, Medium Level of Activity in Year 1, 12+ Months to Complete, <50% Funding Available for Full Implementation)*

#### Activity 1-Promote and Support Environmental Education in Monroe County and State Schools.

The Education Program supported the additional development of a Monroe County Environmental Education Plan. The plan provides sequential exposure to environmental issues over the course of a student's development (from grades K-12). Sanctuary education staff and/or other professional environmental educators will develop grade-appropriate environmental education materials, provide and support natural and cultural resources field trips, and provide educators (private and public) with informa-

### Community-Involvement/Community-Program Strategies

#### E.4: Training/Workshops/School Programs

- Promote/support environmental education in Monroe County and State schools
- Produce the Florida Keys Environmental Education Resource Directory
- Provide/support environmental education workshops for educators
- Provide environmental education for law enforcement personnel
- Sponsor and support adult environmental education
- Establish a certification program
- Deliver education at the resource (Team O.C.E.A.N.)

#### E.6: Advisory Board

- Establish an education advisory board

#### E.10: Public Forum

- Establish public meeting program
- Develop a speakers' bureau and lecture series
- Conduct a poster contest
- Conduct a photo contest

#### E.11: Special Events

- Develop and maintain trade show information booths
- Hold an environmental exposition
- Hold a Sanctuary grand opening
- Design and implement a Kids' Week
- Design and implement a Sanctuary Awareness Week

#### E.12: Professional Development of Education and Outreach Staff

tion regarding Sanctuary resources. Education staff will train volunteers and professional educators to provide presentations and support and conduct field trips. A strong component of this activity will be to include field trips to sites throughout the Keys to emphasize the connectedness of the local ecosystems. While engaging in this activity, Sanctuary staff will take advantage of the network of educators and institutions already in place, including the Monroe County School District. Expand the Coral Reef Classroom to educate about more habitats such as nearshore and bay areas. Education programs should focus on the cognitive development of the students as well as skill-based knowledge. The FKNMS will have the authority and option to issue RFP's for educational services to be awarded on a competitive basis.

■**Existing Program Implementation.** The Sanctuary Program currently provides an intensive marine education program for students in grades 7-9 at the Key Largo and Looe Key national marine sanctuaries. This two-day Coral Reef Classroom involves both lectures and on-water scientific instruction. It currently takes place over a five-week period during the Spring. Sanctuary education staff conduct all aspects of the course, and are working closely with the Monroe County school system to develop a comprehensive environmental education program for grades K-12. The Sanctuary Program also currently provides field trip opportunities for school groups and other independent environmental education organizations on request.

■**Implementation.** The Coral Reef Classroom program will be expanded to the Key West area, and classes will be offered over the course of the year. A part-time staff person will be responsible for organizing the course, and grant funds will be sought to support this effort. This program will be expanded to include more habitat such as the nearshore and bay areas. After a county school system education program is developed, the education staff will work with the county science coordinator to schedule field trips, or will provide information on other environmental programs that may provide educational support. Environmental educators within the school system and in private organizations will receive Sanctuary information on a regular basis. This information may be related to current resource issues and Sanctuary programs. Workshops will be investigated as a possible avenue for information dissemination, and educators will receive in-service credit for attending. There is a need to work more closely with elementary teachers on the development of thematic units for each grade (i.e. develop an articulated scope and sequence). It is recommended that the education staff seek to actively involve teachers, or teams of teachers, in such developmental efforts.

■**Schedule.** This activity will have a high level of action in year 1. It will be continuous.

**Activity 2-Produce the Florida Keys Environmental Education Resource Directory (FKEERD).** A directory of environmental (natural and historical-cultural resource) education activities in the Keys, including a description and listing of the groups involved, will be produced and distributed to interested parties. Information will be derived from the results of a 1991 survey of environmental educators and two workshops held with environmental educators. The directory will be updated every three years, ensuring that existing activities are not duplicated.

■**Existing Program Implementation.** The directory is currently available within the Sanctuary.

■**Implementation.** Sanctuary education staff will be responsible for producing the directory, and providing copies on request.

■**Schedule.** This activity will have a low level of action in year 1. It will require 8 months to complete.

**Activity 3-Provide and/or Support Environmental Education Workshops for Educators.** This activity will enhance the knowledge base of local educators through environmental education workshops regarding the Keys' natural and cultural resources, and will insure that the education community within the Keys is communicating consistent, accurate scientific information. Co-sponsorship of educational workshops (with financial assistance) will be investigated.

■**Existing Program Implementation.** Sanctuary education staff currently provide logistical support and instruction for teacher in-service and environmental education workshops sponsored by the Monroe County school system and other local environmental education programs.

■**Implementation.** Using the FKEERD, Sanctuary education staff will identify programs that provide training for environmental educators. Staff members will contact these programs to discuss how the Sanctuary Program can help. The staff will also determine whether training opportunities are lacking, and will coordinate with other groups to organize future workshops if necessary. Staff will incorporate the assistance of the local community of environmental educators already in place.

■**Schedule.** This activity will have a high level of action in year 1. It will be continuous.

**Activity 4-Provide Environmental Education for Law Enforcement Personnel.** Provide basic environmental education to law enforcement personnel regarding resource identification, and ecosystem significance. Because many law enforcement personnel operating in the Sanctuary will be cross-deputized, training on the Sanctuary's natural and cultural resources will be essential. Officers must understand environmental consequences that can occur as a result of violations. This approach should emphasize both cognitive and skill-based educational programming for these officers. It should also provide these officers with educational skills so that they act in the role of educators as well as enforcement agents.



■**Existing Program Implementation.** Federal/State and Sanctuary education and management staff currently assist the Florida Marine Patrol (FMP) and National Marine Fisheries Service (NMFS) law enforcement personnel when necessary. The Federal Law Enforcement Training Center provides training as does the State.

■**Implementation.** Sanctuary education staff will work with the FMP, NMFS and other Federal and State entities to develop training courses for law enforcement personnel.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 12+ months to complete.

**Activity 5-Sponsor and Support Adult Environmental Education.** This activity will sponsor and support environmental education opportunities for local adults interested in learning more about the Keys' natural and cultural resources. Organizations offering adult education (e.g., Florida Keys Community College, the Power Squadron, and the U.S. Coast Guard Auxiliary) will be identified. Education staff will assist programs offering environmental (natural and cultural) education courses by conducting guest lectures, organizing field trips, and distributing educational brochures. When environmental education is not part of an organization's program, staff will confer with instructors to determine if such information may be included and what form it may take.

■**Existing Program Implementation.** Sanctuary staff often conduct guest lectures and offer field trip opportunities for the Florida Keys Community College, Florida Institute of Oceanography (FIO), and other organizations on request. There are also historical and cultural resource education programs in south Florida which provide opportunities for cooperation.

■**Implementation.** Sanctuary education staff will identify and contact adult education organizations to determine how the Sanctuary may support their efforts and/or establish an environmental education focus.

■**Schedule.** This activity will have a medium level of action in year 1. It will be continuous.

**Activity 6-Establish a Certification Program.** Environmentally responsible business practices will be encouraged through this voluntary activity. Criteria

will be established that, when fulfilled, will qualify businesses to be "certified" as environmentally conscious operators. The businesses and their patrons will be provided with educational information regarding Sanctuary resources and regulations. A training program may be a component of this activity. Participation in any certification programs will be voluntary.

■**Implementation.** Sanctuary education staff will contact the Florida Association of Dive Operators, the Keys Association of Dive Operators, Professional Association of Dive Instructors, National Association of Underwater Instructors, the Young Men's Christian Association, chambers of commerce, and Tourist Development Council to determine the level of interest in this program and potential funding sources. The education staff, in coordination with staff from interested organizations, will develop the certification requirements and training materials.

■**Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 7- Provide mechanisms outside of the law enforcement sector that can help deliver resource education at the site of the resource.**

An example may include volunteer and/or paid personnel located at popular Sanctuary sites where the public is likely to access the resource (i.e. Team O.C.E.A.N.).

■**Implementation.** Sanctuary education staff is working with volunteers to accomplish this, and using Federal and State funds to support this work.

■**Schedule.** This activity will have a high level of action in year 1. It will be continuous.

This strategy is also included in the Volunteer and Water Quality action plans.

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### **Strategy E.6: Education Advisory Board**

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Establish an Education Advisory Board to advise educators on education goals, priorities, and funding sources for the Sanctuary. A full-time staff person will eventually be provided to devote 100 percent of his/her time to Advisory Board matters. The Advisory Board will provide a mechanism to introduce new ideas into the overall sanctuary Education and Outreach Action Plan.

The Advisory Board will examine and provide recommendations on matters important to implementing goals, objectives and strategies. The Education Advisory Board should also work to coordinate grant funding approaches made by the constituents in order to avoid duplication of effort, secure mutual support for projects and avoid competing for scarce financial resources. *(Priority Level High, Year 1 Activity, 6+ Months to Complete, 100% Funding Available for Full Implementation)*

**Activity 1- Create an Education Advisory Board.**

The Board will be composed of members that represent diverse sectors and interests. This Board will be a working group of the Florida Keys National Marine Sanctuary Advisory Council. A majority of these members will be from the Florida Keys. Group activities will include but not be limited to 1) providing information on current activities in the education community; 2) encouraging cooperative efforts; 3) providing direction for the Sanctuary Education Program; 4) preventing the duplication of efforts; 5) promoting stewardship; and 6) guiding development of natural and cultural resource education products.

■**Implementation.** Sanctuary education staff will use the FKEERD and other relevant sources to identify environmental education organizations, and will select organizations based on regional or geographical representation (Upper, Middle and Lower Keys) and/or sector-based representation on the advisory board. Periodic meetings will be organized by the education staff. There will be an annual meeting of educational facility representatives.

The majority of members will be from the Florida Keys, and will represent diverse sectors and interests. These might include:

- The Monroe County Environmental Education Advisory Council;
- K-12 schools;
- the Monroe County School District, and the District EE Advisory Council;
- Florida Keys Community College and local colleges;
- Non-formal institutions which make extensive use of FKNMS resources and sites (e.g., Newfound Harbor Marine Institute, Pigeon Key, Sea Base, Marine Resources Development Foundation);
- Public information and education programs (e.g., public TV and radio stations);
- Entities which provide information and education programs (i.e. Reef Relief) for user groups (e.g., skin and scuba courses on reef ecology;

sport fishermen programs on catch-and-release);

- Commercial interests whose livelihoods are tied to non-consumptive and consumptive uses of resources within the Sanctuary; and federal and state agencies which currently operate some form of information and education program within the FKNMS boundaries.

In addition, there are other groups with interests which are not located in the Keys per se, yet who are willing and able to provide support to the Education Plan and programs of the FKNMS. These include:

- Agencies with jurisdictional interests in or directly related to the FKNMS;
- Conservation and environmental organizations with interests in informational, interpretive or educational programs;
- State education and teacher organizations (e.g., FAST, FMSEA, LEEF); and
- Educational organizations who hold meetings and conferences in the Keys on a periodic or regular basis.

■**Schedule.** This activity will have high priority in year 1. It will require 6+ months to complete.

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**Strategy E.10:  
Public Forum**

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Establish a program to ensure public involvement throughout South Florida in Sanctuary activities by holding public meetings and promoting Sanctuary awareness to extracurricular groups. A program will be established to provide Sanctuary sponsorship of contests/awards. *(Priority Level Medium, Low Level of Action in Year 1, 12+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Establish a Public Meeting Program.** A series of public meetings will be held throughout Monroe County to provide information to encourage user participation in Sanctuary management. Sanctuary staff and/or guest speakers will make presentations, and dialogue between staff members and the public will be encouraged. The activity will: 1) enhance communication between Sanctuary staff and the public; 2) provide an opportunity for periodic public input; and 3) provide an opportunity to educate the public about current management issues.

■**Existing Program Implementation.** The Looe Key and Key Largo National Marine Sanctuaries have

traditionally held "frequent-user meetings" in the Upper and Lower Keys. These meetings are forums that provide information on topics including Sanctuary regulations, research activities, and education programs.

■**Implementation.** Sanctuary education and management staff will have the primary responsibility for implementing this activity. Meetings will be held twice a year in the Upper, Middle, and Lower Keys, respectively. Both the public and commercial/recreational users will be invited to attend. Sanctuary staff will present information about management, education, research, and law enforcement practices. Guest speakers may also present information on timely topics. Dialogue and feedback from the participants will be encouraged.

■**Schedule.** This activity will have a low level of action in year 1. It will require 2+ months to complete.

**Activity 2-Develop a Speakers' Bureau and Lecture Series.** A speakers' bureau and public lecture series will be established that will cover environmental themes such as species (e.g., native, rare, endangered, understanding life histories), Keys' history, research results, environmental action, weather, South Florida, artificial reefs, and diving. The bureau will include local citizens who will give presentations by request. Both the bureau and lecture series will enhance public understanding (especially for local and visiting adults) of Sanctuary-related topics. This activity will have an "outreach" component to provide services to audiences at the state, national and international location.

■**Existing Program Implementation.** Sanctuary staff currently give presentations by request.

■**Implementation.** Sanctuary education staff members will work with the volunteer coordinator and education advisory board to compile a list of potential lecture topics and speakers. Each series will run from November to May.

■**Schedule.** This activity will have a low level of action in year 1. It will require 7+ months to complete.

**Activity 3-Conduct a Poster Contest.** A theme-oriented poster contest will be conducted through Monroe County school system art classes. The contest will provide a creative method for educating local students about the Sanctuary.

■**Implementation.** Sanctuary education staff will coordinate with science and art teachers in Monroe

County to establish the poster contest (e.g., determining the contest theme and educational message).

■**Schedule.** This activity will have no action in year 1. It will require 3 months to complete.

**Activity 4-Conduct a Photo Contest.** Underwater and top-side photo and/or video contests will be conducted to draw attention to the natural resources of the Keys' marine ecosystem. The objective is to focus public attention on the beauty and importance of Sanctuary habitats.

■**Existing Program Implementation.** The Looe Key and Key Largo National Marine Sanctuaries have co-sponsored photo contests in the past.

■**Implementation.** Sanctuary education staff will identify a co-sponsor for this event. Photos and videos will be solicited in a variety of categories and prizes will be requested from local vendors. Winning entries will be circulated throughout Monroe County and may tour outside South Florida.

■**Schedule.** No action will occur in year 1. It will be continuous.

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### **Strategy E.11: Special Events**

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Organize, support, and/or participate in special events (e.g., trade shows, expositions, grand openings, etc.) that allow for the exchange of Sanctuary information. The Sanctuary will co-sponsor a number of conferences and workshops, with selected sole sponsorship of some events. This would include a "Sanctuary Awareness Week" and a Sanctuary "Grand Opening". The Sanctuary Program would cosponsor other "awareness" events/weeks (e.g., National Fishing Week, etc.).  
(Priority Level Medium, Low Level of Action in Year 1, 9+ Months to Complete, <50% Funding Available for Full Implementation)

**Activity 1-Develop and Maintain Trade Show Information Booths.** Sanctuary staff will attend trade shows, local festivals, and other events, and set up displays to provide the public with information about Sanctuary resources.

■**Existing Program Implementation.** Sanctuary staff, using portable displays (e.g., posters) from the Key Largo and Looe Key National Marine Sanctuaries,

currently distribute Sanctuary information at local festivals and trade shows.

■**Implementation.** Education staff will identify the festivals and trade shows that provide the most-effective and efficient use of Sanctuary resources. The events selected will be those that attract a large audience. Materials developed in the signs/displays/exhibits strategy will be used. For future budgeting purposes, a list of staff assignments and shows will be compiled.

■**Schedule.** This activity will have a high level of action in year 1. It will be continuous.

**Activity 2-Organize an Environmental Exposition.**

This forum will display environmentally sensitive products and technologies (e.g., sewage treatments options and alternative fishing gear) to educate the public regarding environmentally safe products and services.

■**Implementation.** The Sanctuary Program, working closely with the education staff, will contract with a private vendor to organize the environmental exposition. Co-sponsors will be solicited, and the event will take place at a central location in the Keys, either once or twice a year.

■**Schedule.** This activity will have a low level of action in year 1. It will require 9 months to complete.

**Activity 3-Hold a Sanctuary Grand Opening.** A large-scale social event will be held to announce the "grand opening" of the Sanctuary. This event may coincide with the first annual Environmental Exposition.

■**Implementation.** Sanctuary managers and education and outreach staff will work with the volunteer coordinator to plan a gala event to celebrate the Sanctuary's opening. The event will be held in a central location in the Keys.

■**Schedule.** This activity will have no action in year 1. It will require 3 months to complete.

**Activity 4-Design and Implement a Kids' Week.** A Kids' Week filled with special events for school students designed to enhance their awareness of the environment will be conducted. The events are intended to inspire a sense of stewardship for the environment, and illustrate that kids are direct participants in protecting the Sanctuary's resources.

■**Implementation.** Sanctuary education staff, in cooperation with the Volunteer Program staff and other cosponsors, will organize Kids' Week events. Activities may consist of lectures, classroom visits, field experiences, audio-visual presentations, and television shows.

■**Schedule.** This activity will have no action in year 1. It will require 6+ months to complete.

**Activity 5-Design and Implement a Sanctuary Awareness Week.** A week of activities designed to draw attention to the existence of the Sanctuary and the achievements of the Sanctuary Program will be conducted. The events are designed to raise awareness of the Sanctuary and generate a sense of stewardship for the resources of the Florida Keys.

■**Implementation.** Sanctuary management, education, outreach, enforcement, research and volunteer staff will together generate the activities for this event. Other commercial and nonprofit organizations will then be approached about participating and/or sponsoring some activities to take place. The event will be held during the busiest season, November through April, in order to reach the most people.

■**Schedule.** This activity will have no action in year 1. It will require 9 months to complete.

This strategy is also included in the Volunteer Action Plan.

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## Strategy E. 12 Professional Development of Education and Outreach Staff and Cooperating Educators

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Develop a set of activities that provide for education for new members of the FKNMS education and outreach staff. Also provide continuing education for current staff.

■**Implementation.** Sanctuary education staff will attend professional conferences and programs. New staff will be provided with appropriate orientation programs.

■**Schedule.** Continuous.

## Product Development Strategies

This group of strategies includes those centered on the development of some type of product. Print, audio, and video communication products are an integral component of the Sanctuary's public education and outreach program. Products produced through these strategies will be used as tools for implementing many other strategies in the management plan. Activities include the development of printed materials to promote public awareness of the Sanctuary; the production of a limited number of audio-visual materials; the establishment of signs and displays in high-use areas; the development of a program of public service announcements; and the establishment of visitor booths and displays for the distribution of educational materials. Materials shall be multilingual when appropriate and necessary. A focus of these materials shall be to disseminate current research and results to the public in a timely fashion. Strategies in this group may be revised or deleted and new strategies may be added, based on the progress and success of the strategies proposed.

### Strategy E.1: Printed Materials

Develop printed materials to promote the public's awareness of the impact of their activities, both land and water-related, on the Sanctuary's resources and environmental quality. Promote the proper use of equipment used for these activities in order to minimize adverse impacts to natural resources. Materials will include brochures, posters, newsletters, contributions to periodicals, environmental nautical charts, color environmental atlases, and a color periodical. Distribute materials in bulk to high interception locations (e.g., marinas, boat ramps, dive shops, etc.) and include bulk mailings as a means of distribution.

*(Priority Level High, Low Level of Action in Year 1, It will be Continuous, <50% Funding Available for Full Implementation)*

**Activity 1-Design and Print a Sanctuary Brochure.** A brochure will be produced that contains comprehensive information about the Sanctuary.

■**Existing Program Implementation.** Under contract by NOAA, the Center for Marine Conservation developed a brochure in 1991. It educated the public about Sanctuary boundaries and designation and the

Management Plan development process. The new brochure will summarize important components of the Management Plan and new Sanctuary programs.

■**Implementation.** The brochure will be designed by the Sanctuary education staff and will be printed using State or Federal funds. Design and production will begin as soon as the management plan is approved. The brochure will be updated in year 5, following the adoption of the management plan.

■**Schedule.** This activity will have a high level of action in year 1. It will require six months to complete.

**Activity 2-Produce a Monthly FKNMS Newsletter.** Sanctuary staff will produce a monthly color periodical. This newsletter will include information about current developments in FKNMS management, featuring projects and programs in the Sanctuary.

■**Existing Program Implementation.** Sanctuary staff produce a monthly newsletter titled "Sounding Line." The newsletter features projects and programs underway. It is mailed to a list of individuals and organizations nationwide who have expressed an interest in staying informed with regard to the Sanctuary.

■**Implementation.** Sanctuary staff will continue to develop the content of the monthly newsletter. Education and outreach staff will have primary responsibility for creative design to support the theme and content of each issue. All program disciplines will be asked to contribute articles and/or provide input on content and theme.

■**Schedule.** This activity will have a medium level of action in year 1. It will be continuous.

**Activity 3-Provide Information to Shipping Businesses.** Shipping business will be alerted about Sanctuary regulations (e.g., vessel waste discharge and Areas to be Avoided). Target audiences include large importers/exporters, port authorities, commercial fishing companies, and ship insurers.

■**Existing Program Implementation.** Information about the Areas to be Avoided and Sanctuary boundaries have already been included on NOAA nautical charts, but no educational or descriptive information has been distributed to the users directly.

■**Implementation.** The education staff will provide educational products (e.g., videos, brochures) to NOAA's Sanctuaries and Reserves Division (SRD).

SRD headquarters and the National Ocean Service (NOS) general counsel will contact the appropriate U S and international shipping interests. Field education staff will contact local port authorities and large vessel operators. NOAA headquarters, field and general counsel staff, and Florida's Bureau of Sanctuaries and Research Reserves will work cooperatively in implementing this activity.

■ **Schedule** This activity will have a low level of action in year 1. It will be continuous.

**Activity 4-Provide Information to Community Leaders, Decision makers, and Organized User Groups.** Community leaders, decision makers, and organized user groups will be informed about Sanctuary programs, zoning, research results, and the environmental consequences of their activities through mailings, speakers, and personal contact.

Their constituents will be educated as an indirect result of this activity.

■ **Existing Program Implementation** Sanctuary employees currently give information to user groups and businesses, and brief decision makers on request. However, no standardized program for providing information has been developed.

■ **Implementation** Expanding this activity requires the development of topic-specific audio-visual products for group mailings (when staff are not available). This program is currently being implemented by the Sanctuary education staff. The scope of this effort will expand as staff size increases and audio-visual materials are produced.

■ **Schedule** This activity will have a low level of action in year 1. It will be continuous.

### Product-Development Strategies

#### E.1: Printed Materials

- Design and print a Sanctuary brochure
- Produce a monthly FKNMS newsletter
- Provide information to shipping businesses
- Provide information to community leaders, decisionmakers, and organized user groups
- Provide interpretive information to periodicals and publications
- Provide information to businesses about sanctuary resources and activities
- Provide multilingual information to marine rental businesses
- Distribute educational materials at public boat ramps
- Produce and distribute a fact sheet on sanctuary boating rules, regulations, and etiquette to be distributed with annual registrations
- Produce a fact sheet for the Tourist Development Council
- Distribute information regarding the Sanctuary in utility bills, newsletters, and vehicle licenses/registrations
- Provide information to service industries about environmentally safe practices
- Produce a color environmental atlas for the Sanctuary

#### E.2: Audio-Visual Materials

- Establish an audio and video library
- Produce audio and video tapes and theme-oriented slide presentations

#### E.3: Signs/Displays/Exhibits

- Establish wayside exhibits in the Florida Keys
- Establish static displays at appropriate locations
- Develop mobile displays with information on all aspects of the Sanctuary program
- Develop interactive educational computer stations
- Establish information booths at South Florida airports, car rental agencies, and visitor centers along US 1.
- Design and install road-side signs

#### E.5: PSAs

- Develop a program of PSAs
- Develop a media packet
- Develop and produce a series of video news releases
- Print marine etiquette on marine-related materials packaging
- Establish VHF and dedicated AM radio stations

#### E.7: Promotional

- Establish visitor booths/displays to distribute educational materials
- Establish interagency visitor center for orientation purposes

**Activity 5-Provide Interpretive Information to Periodicals and Publications.** Specific user groups or communities (e.g., the diving and fishing industries, research community, local naval facilities, and Spanish community) will be targeted with information about Sanctuary programs, research findings, and regulations.

■**Existing Program Implementation.** Administrative, research, and education staff currently provide articles to periodicals and newspapers. A limited number of articles have been produced by the Sanctuary Advisory Council for submission to local newspapers. This effort was supported by the Sanctuary's Volunteer Program.

■**Implementation.** In cooperation with the Volunteer Coordinator, the education staff will identify topics, authors, and media recipients for a continuing series of written pieces to be submitted for publication. Articles of various lengths should begin to be submitted by the end of year 1.

■**Schedule.** This activity will have a low level of action in year 1. It will be continuous.

**Activity 6-Provide Information to Businesses about Sanctuary Resources and Activities.**

Information regarding Sanctuary regulations and resources will be provided to local on-water businesses.

■**Existing Program Implementation.** In the past, dive shops and selected marinas have received Sanctuary brochures and educational videos.

■**Implementation.** The education and outreach staff will develop a mailing list of water-related businesses in the Keys, and educational information will be distributed based on this list. The Volunteer Program will assist in distributing these materials.

■**Schedule.** This activity will have a low level of action in year 1. It will be continuous.

**Activity 7-Provide Multilingual Information to Marine Rental Businesses.** Multilingual information regarding Sanctuary activities including programs, regulations, and research activities will be provided to marine rental businesses (e.g., boat and personal watercraft rental operations, marina gas facilities, etc.) to educate rental operators and patrons about environmental issues.

■**Existing Program Implementation.** The education and outreach staff currently distributes multilingual

videos, brochures, posters, and placards to marinas, dive shops, and boat rental businesses every two months or on request.

■**Implementation.** The education and outreach staff will continue to distribute multilingual educational information. Once the Management Plan has been adopted, staff will design and produce targeted educational materials.

■**Schedule.** This activity will have a low level of action in year 1. It will be continuous.

**Activity 8-Distribute Educational Materials at Public Boat Ramps.** Boaters will be provided with information about Sanctuary objectives, regulations, and safe boating practices at public boat ramps.

■**Implementation.** The education and outreach staff will work with the Sanctuary Volunteer Program and other local volunteer organizations to distribute educational materials. A cooperative agreement may be sought to achieve this activity.

■**Schedule.** This activity will have a low level of action in year 1. It will be continuous.

**Activity 9-Produce and Distribute a Fact Sheet on Sanctuary Boating Rules, Regulations, and Etiquette to be Distributed with Annual Registrations.** The fact sheet will be an effective means of disseminating information about Sanctuary resources and regulations to boat owners and operators.

■**Implementation.** The sheet will be developed by the education and outreach staff. Distribution will be coordinated by the education staff and the Florida Department of Environmental Protection (FDEP), and will occur when registrations are issued or renewed.

■**Schedule.** This activity will have a low level of action in year 1. It will be continuous.

**Activity 10-Produce a Fact Sheet for the Tourist Development Council.** The fact sheet will provide potential Sanctuary visitors with information about environmentally responsible behavior. It will also inform tourists of the environmental damage that may result from inappropriate actions.

■**Implementation.** The fact sheet will be prepared by the education and outreach staff, and will be reproduced and distributed by the Tourist Development Council (TDC). An agreement will be established with the TDC for implementing this activity.

■ **Schedule.** This activity will have no action in year 1. It will require 6+ months to complete.

**Activity 11-Distribute Information Regarding the Sanctuary in Utility Bills, Newsletters, and Vehicle/Licenses/Registrations.** Through this activity, all residents of the Keys will receive information about the Sanctuary and the impacts of their water and land-based activities on Sanctuary resources. An informative brochure, including associated regulations and environmentally responsible methods of sewage and solid waste disposal and other household activities, will be included with utility bills and vehicle/boat registrations. Articles about the Sanctuary will also be included in utility newsletters.

■ **Implementation.** The education and outreach staff will develop and submit brochures and articles to the appropriate utility companies and State and local agencies. Volunteers may help prepare and deliver newsletter articles.

■ **Schedule.** This activity will have no action in year 1. It will be continuous.

**Activity 12-Provide Information to Service Industries About Environmentally Safe Practices.**

Service industry personnel will be educated about environmentally safe practices.

■ **Implementation.** The education and outreach staff will provide the educational materials, which will be distributed by volunteers as part of the Volunteer Program.

■ **Schedule.** This activity will have no action in year 1. It will be continuous.

**Activity 13-Produce a Color Environmental Atlas for the Sanctuary.** Sanctuary education and outreach staff will work with NOAA, FDEP, and the Florida Marine Research Institute (FMRI) to produce a color atlas of Sanctuary resources including habitat types, population, hurricane paths, and other environmental or social themes to be determined.

■ **Existing Implementation.** The FDEP has developed and produced benthic habitat maps for the FKNMS.

■ **Implementation.** As information is gathered, NOAA will update the benthic habitat maps that have been produced. Concurrently, education and outreach staff will consult with NOAA and the FDEP and identify other themes for the atlas. As useful data become available, they will be included in the environmental atlas. Education staff will identify locations for copies

of the atlas to be distributed and organize distribution with assistance from the Volunteer Program.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**This strategy is also included in the Volunteer Action Plan.**

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## Strategy E.2: Audio-Visual Materials

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Inventory and use existing videos, films, and audio-visual environmental education materials portraying activities in the Florida Keys, and their impacts on Sanctuary resources. Produce a limited number of audios/videos to address gaps in available materials, and to address major activities including boating, fishing, diving, etc. Materials will be available at Sanctuary offices and will be distributed to key locations (dive shops, etc.) throughout South Florida. Materials will be multi-lingual as necessary and appropriate. (*Priority Level Medium, Low Level of Action in Year 1, 3+ Months to Complete, <50% Funding Available for Full Implementation*)

**Activity 1-Establish Audio and Video Library.**

Audio-visual materials will be collected and organized, and a Sanctuary library created for use by Sanctuary staff and the public.

■ **Existing Program Implementation.** Sanctuary offices currently have slide collections. Duplicates may be provided upon request.

■ **Implementation.** The education and outreach staff will coordinate with the Volunteer Program to implement this activity. Slides, videos, and audio tapes will be cataloged by type of media, subject, and length. New contributions to Sanctuary slide and video libraries will be solicited from amateur and professional photographers. Additional video and audio tapes will be acquired based on budget allowances. Duplicates may be provided upon request. A system will be developed and implemented to provide for the loan of audio-visual products.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 3 months to complete. Donations will be accepted on a continuing basis.

**Activity 2-Produce Audio and Video Tapes and Theme-Oriented Slide Presentations.** Topic-oriented audio and video tapes and slide presenta-



tions will be developed for specific age groups, and their complexity will vary according to the intended audience. Products may range from short instructional pieces to longer presentations that summarize the Sanctuary development process. In addition, a weekly video television program, *Waterways*, will be produced to feature various scientific, educational, and management programs that occur in Sanctuary waters.

■**Existing Program Implementation.** Several videos have been produced which focus on the general setting of the Sanctuary, and some on-water activities and their impacts on Sanctuary resources. Two were produced by Looe Key and Key Largo national marine sanctuaries, one was produced by the FDEP and one was produced by the FIO. Each is available to the Sanctuary to reproduce and distribute. *Waterways* is being produced and aired on a weekly basis in partnership with ENP and EPA.

■**Implementation.** The education and outreach staff, Volunteer Program, and government or private interests (via cooperative agreements) will produce the educational presentations. Videos will range in length, with most lasting between 10 and 20 minutes. If possible, videos will be bilingual (i.e., English and Spanish). Topics will include FKNMS existence, programs and regulations, scientific research, educational projects, water quality, and habitat degradation issues (e.g., boating, fishing, and diving impacts). Outreach staff will continue to produce 30 minute episodes of *Waterways* exploring the topics mentioned above.

■**Schedule.** This activity will have a medium level of action in year 1. It will be continuous.

***This strategy is also included in the Volunteer Action Plan.***

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### **Strategy E.3: Signs/Displays/Exhibits**

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Develop signs and displays at high-use areas, all public and some private boat ramps, and some public beach access areas to inform participants in water-based activities of regulations and environmentally sound practices, provide navigation information, and promote awareness of nearby sensitive areas. Establish visitor centers/booths at locations throughout the Keys at Sanctuary offices, Chamber of Commerce visitor centers, etc. Portable displays will

also be produced with information on Sanctuary resources, regulations, environmental quality, etc. The signs will be multilingual where necessary and appropriate. Targeted multimedia displays will be developed with information and impacts on the Sanctuary relevant to the activity targeted. A number of wayside exhibits will be installed.

Develop a user-friendly computer system containing information on regulations, access, recreational sites, environmental etiquette, etc. for visitor use at selected sites throughout the Sanctuary within five years. (*Priority Level Medium, Low Level of Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation*)

***Activity 1-Establish Wayside Exhibits in the Florida Keys.*** Wayside exhibits are an effective means of educating the public about the Sanctuary. More than one exhibit may be established for location at popular fishing and disembarkation points in the Keys. The exhibits will provide information about Sanctuary boundaries, resources, and regulations.

■**Existing Program Implementation.** The education and outreach staff has designed a wayside exhibit for the Florida Keys National Marine Sanctuary, and approximately 40 to 50 exhibits have been placed at boat launching sites throughout the Keys. In addition, the FDEP's Division of State Lands has designed a wayside exhibit. Some exhibits have been placed at popular fishing and boat-launching sites. In addition, the U.S. Fish and Wildlife Service (FWS) is developing a wayside exhibit to be placed at disembarkation points near the boundaries of wildlife refuges located in the Keys.

■**Implementation.** Additional sites in the Keys have been identified for the placement of wayside exhibits, and an exhibit has been designed that gives information about Sanctuary boundaries, resources, and restrictions. Once the Management Plan is adopted, existing exhibits may need to be updated to reflect new regulations. A new exhibit may be designed or a second side, containing new information, may be attached to existing exhibits. A cooperative agreement will be sought to produce and install the exhibits. The education staff will be responsible for implementing this activity. Volunteers may be used to place the exhibits.

■**Schedule.** This activity will have a high level of action in year 1. It will require 6 months to complete.

***Activity 2-Establish Static Displays at Appropriate Locations.*** Space will be secured and informa-

tional displays about the Sanctuary set up at visitor centers, sanctuary offices, museums, libraries, chambers of commerce and State Parks. These static displays will provide general information about the Sanctuary, and will educate visitors and residents about requirements and measures they can take to protect the area's natural resources. This product differs from wayside exhibits due to display design and information. These displays will be located indoors, and will focus on a broader range of topics than the wayside exhibit. In addition, an element of flexibility is contained within the static indoor displays that is not achieved with wayside exhibits.

■**Existing Program Implementation.** A display is currently located at John Pennekamp Coral Reef State Park that describes the Sanctuary and its associated programs. Local chambers of commerce also display Sanctuary brochures.

■**Implementation.** Education and outreach staff, along with the Volunteer Program, will identify potential exhibit sites. Cooperative agreements will be sought with entities outside the Sanctuary Program to assist in the design and funding of displays. Static displays will be bilingual (English/Spanish) or multilingual, depending on space availability. Sites under consideration already include the Key West Aquarium and the Florida Keys Natural History Museum.

■**Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 3-Develop Mobile Displays with Information on all Aspects of the Sanctuary Program.** Each display will have a different focus and, because they are mobile, could be used at conventions, trade shows, educational meetings, or scientific gatherings. General information regarding Sanctuary location and programs may be communicated, along with current educational activities or research findings.

■**Existing Program Implementation.** One stand-alone display has been developed that conveys general information about the Looe Key and Key Largo national marine sanctuaries. It has been used at conventions, festivals, and trade shows.

■**Implementation.** The education and outreach staff will be responsible for implementing this activity. If sufficient funding is available, a contractor will be hired to construct the displays. In year 1 it is anticipated that three tabletop displays will be purchased. One will focus on general Sanctuary information, the second on Sanctuary education programs, and the third on current research topics. During year 2, a

stand-alone exhibit conveying information about all aspects of Sanctuary operations will be purchased. Additional tabletop displays will be developed in year 3. Grant funding and donations will be actively sought to support display development and construction activities. Volunteers with appropriate expertise will assist in design and construction activities if necessary.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 36 months to complete.

**Activity 4-Develop Interactive Educational Computer Stations.** Interactive educational displays that convey information about Sanctuary boundaries, regulations, resources, education programs, research programs, and volunteer opportunities will be developed at locations throughout the Keys. Each station will include current Sanctuary data that may be accessed by any visitor. These stations will have an audio and visual component, and will include a combination of stationary graphics, an interactive computer terminal, and audio recordings.

■**Implementation.** The education and outreach staff will define the content and logic for the interactive computer program, and volunteers will provide assistance. However, a private vendor will be contracted to develop and design the program. A pilot system will be established in year 1. Alterations will be made based on information obtained in the pilot, and additional sites will be identified for the placement of systems. Funding will be sought for placement locations from private and not-for-profit organizations.

■**Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

■**Cost:** To be determined.

**Activity 5-Establish Information Booths at South Florida Airports, Car Rental Agencies, and Visitor Centers Along US 1.** These booths will establish special areas promoting the Sanctuary at high-use tourist locations, and will provide public exposure regarding the Sanctuary and the South Florida ecosystem.

■**Implementation.** The education and outreach staff will identify booth sites and investigate potential funding sources. Booths will be designed on a site-by-site basis. Construction (when necessary) will either be conducted by volunteers or private contractors. The Sanctuary Program and other groups will

provide written materials for the booths. Input will be sought from the TDC and local chambers of commerce. When appropriate, bilingual materials will be provided.

■**Schedule.** This activity will have no action in year 1. It will require 24 months to complete.

■**Cost.** To be determined.

**Activity 6-Design and Install Roadside Signs.**

Signs will be installed along the roadside in the Homestead/Key Largo area to alert travelers that they are entering/leaving the Sanctuary.

■**Implementation.** Education and outreach staff will design a sign to be placed on the roadside which will alert motorists that they are entering the Florida Keys National Marine Sanctuary. Sanctuary management staff will coordinate with the Florida Department of Transportation for location approval and installation.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 9 months to complete.

***This strategy is also included in the Volunteer Action Plan.***

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**Strategy E.5:  
PSAs**

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Establish a program to promote Sanctuary goals and activities through public service announcements (PSAs) in South Florida, with some national and international public exposure, that present an overview of the Sanctuary, its resources, and their ecological significance for routine distribution to radio, cable television stations and newspapers. Develop editorial/contributions for other printed media. Funds will be spent on routine media exposure. PSAs will focus on participants in water-related and other activities that affect the Sanctuary (boaters, divers, household etc.). These materials will also be organized into a press packet. Appropriate materials shall be multilingual when necessary. One focus of these materials will be to disseminate current research results to the public in a timely fashion. *(Priority Level Medium, Low Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Develop a Program of PSAs.** A program of public service announcements (PSAs) will be

developed to educate the public about how their activities impact Sanctuary resources. These PSAs will be broadcast on radio and television, and will focus on boating, diving, household activities, other activities impacting Sanctuary resources, and upcoming events sponsored by the Sanctuary. The PSA program will focus primarily on the South Florida community, with limited State, national and international exposure. PSAs will be translated and broadcast on stations that target communities in which English is not the primary language.

■**Existing Program Implementation.** A number of short radio PSAs and one TV PSA have been developed. The radio PSAs are frequently used in conjunction with a special event such as the annual Underwater Music Festival. The television PSA is used as a promotion for the "Waterways" program sponsored by NOAA, ENP, and EPA.

■**Implementation.** The education and outreach staff will be responsible for implementing this activity. Topics will focus on resource values, upcoming programs, and Sanctuary development. The education staff will identify topics and, with the assistance of volunteers, prepare narrative and film or audio announcements. Television and radio broadcast time will be secured as funds allow, with first priority being Monroe County stations.

■**Schedule.** This activity will have a medium level of action in year 1. It will be continuous.

**Activity 2-Develop a Media Packet.** Factual information regarding the natural, cultural, and historic resources of the Sanctuary will be compiled for distribution. Information will be included on dimensions, acreage, and habitat disruption. Halftones or color transparencies and a video may be included. Information will also address the benefits of Sanctuary management, the ecological importance of the area's resources, and concerns and threats to the environment.

■**Implementation.** The education and outreach staff will work with Sanctuary managers to develop a list of materials to be included in the press packet. Staff will then coordinate with the Volunteer Program to develop materials identified as needed, but not currently available. Volunteers will package the materials, and an initial mailing will be done to all local press representatives. In the future, this package will be provided at all public Sanctuary meetings and on request.

■**Schedule.** This activity will have a low level of action in year 1. It will require 6+ months to complete.

**Activity 3-Develop and Produce a Series of Video News Releases.** The media will be provided with information on current Sanctuary issues and activities through the development and production of a series of video news releases. Topics will address a broad range of subjects including, but not limited to, Sanctuary boundary awareness, regulations, zones, education programs/products, and research projects.

■**Implementation.** The education and outreach staff will develop a list of topics for which video news releases would be appropriate. This list will be provided with the press packet. Education and outreach staff will then produce the video news releases with the help of the volunteer staff. General news releases on Sanctuary programs will be provided with press packets. News releases developed on special topics will be provided individually to media contacts (initially television stations in South Florida). As a system is developed, contacts will be expanded throughout Florida and other areas from which visitors originate. Grant funds may be sought to support this effort.

■**Schedule.** This activity will have a low level of action in year 1. It will require 18+ months to complete.

**Activity 4-Print Marine Etiquette on Marine-Related Materials Packaging.** Printing messages about proper on-water etiquette on marine-related materials packaging is expected to improve these types of behaviors. The messages will appear on materials used for water-related activities, such as ice bags and bait boxes.

■**Implementation.** The education and outreach staff will identify appropriate products for marine-related message placement, and will contact the manufacturers and propose the idea of printing conservation messages on their packaging. The staff will also design the print message, for approval by the manufacturer. Volunteers will assist in this activity. The manufacturer will cover the cost of printing and producing the packaging material.

■**Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

■**Cost:** To be determined.

**Activity 5-Establish VHF and Dedicated AM Radio Stations.** A VHF radio information frequency will be

secured and dedicated to provide information about boating and related activities. The broadcasts will include information about Sanctuary regulations, navigation, resources, and weather/reef conditions. Messages will also be developed to help boaters, divers, and fishermen avoid impacting the environment. Information will be broadcast in several languages. A dedicated AM station will also be secured to deliver messages similar to those broadcast over the VHF station. The AM station may include more land-related information.

■**Implementation.** The education and outreach staff will contact the appropriate officials to obtain information on establishing the radio stations. Cost and target area assessments will be conducted. The Upper Keys will have the greatest need for the AM station. The Middle and Lower Keys will follow in years 2-3 and 4-5, respectively. The education staff will program the stations, and hire a program manager when funding is available. The education staff will work closely with the Volunteer Program to utilize volunteer expertise in this area. Grant funding will be sought to support implementation costs.

■**Schedule.** This activity will have no action in year 1. It will require 60+ months to complete.

This strategy is also included in the Volunteer Action Plan.

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### Strategy E.7: Promotional Educational Materials

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Promote educational materials, including bilingual materials and other information about the Sanctuary and its resources, at existing Sanctuary offices and chambers of commerce. Establish interagency visitor centers with the U.S. Department of Interior (USDOI) and the FDEP. (*Priority Level Medium, Low Level of Action in Year 1, 48 Months to Complete, <50% Funding Available for Full Implementation*)

**Activity 1-Establish Visitor Booths/Displays to Distribute Educational Materials.** Visitor booths/displays will be developed to provide multilingual educational materials about Sanctuary resources, etiquette, and environmental quality. Existing Sanctuary offices will provide limited space for distribution on a walk-in basis.

■**Existing Program Implementation.** Each Sanctuary office has a very small area dedicated to the display

### *Action Plans: Education and Outreach*

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and dissemination of educational products (primarily brochures and newsletters).

***This strategy is also included in the Volunteer Action Plan.***

■**Implementation.** The education and outreach staff will establish areas in existing Sanctuary offices for the display of materials. The education and outreach staff or volunteers may be used to help construct the displays. Alternately, an outside contractor will be hired. The education staff will consult with local chambers of commerce to determine if space is available for displaying Sanctuary information. Financial support will be sought from chambers of commerce and the TDC.

■**Schedule.** This activity will have a low level of action in year 1. It requires 12 months to complete.

**Activity 2-Establish Interagency Visitor Center for Orientation Purposes.** An interagency visitor center will be established in cooperation with the USDOJ and the FDEP to provide visitors and residents with orientation information on various protected and managed areas. Cooperative efforts will allow agencies to pool resources and provide lowest-cost options for a special center. One goal of this Interagency Orientation program will be to inform sanctuary program/agency visitors about the extent of education programs (agency and non-agency) offered in the FKNMS.

■**Implementation.** Sanctuary Program managers will secure an interagency agreement with agencies interested in establishing a visitor center. The education staff will consult with Sanctuary managers, agency managers, and other agency personnel to determine the types of exhibits to be included in a visitor center. Activities will be divided among the agencies involved. The education and outreach staff will be responsible for designing and constructing educational exhibits focusing on the Sanctuary Program, and will either develop the exhibits or contract them out. A staff person will also be assigned to manage the visitor center, with salary funding coming from all agencies involved. The Volunteer Program will fulfill the center's additional staffing requirements. The Volunteer Program will fulfill the center's additional staffing requirements. Public information will be provided that describes ongoing programs, activities and organizations involved with educational activities in the Sanctuary.

■**Schedule.** This activity will have no action in year 1. It will require 48 months to complete.

## Implementation

This section explains how the strategies in the education and outreach plan will be implemented. The institutions responsible for each activity, and those agencies that will provide some level of assistance, are identified. Education and outreach strategies are also ranked to indicate their overall Sanctuary priority level. In addition, the planned level of activity in year 1, months required to complete, funding availability, cost estimates, staff requirements, and the geographic focus of each strategy/activity are provided. The process used to evaluate the effectiveness of the Education Program as it evolves over time is also presented.

**Responsible Institutions.** As the FKNMSPA mandates NOAA, EPA, and the State of Florida to provide education and interpretation regarding Sanctuary resources, these agencies will share the lead in implementing specific education and outreach activities, and will be responsible for coordinating the involvement of external organizations. A framework of Federal, State, and local agencies and commercial and nonprofit organizations will be responsible for implementing the overall Program. Efforts will be made to avoid duplicating the efforts of other programs and to utilize and support education efforts being conducted by other organizations. Table 9 lists the participating institutions and their level of responsibility for implementing each activity.

**Prioritization of Implementation.** Each strategy in the Management Plan has been placed in one of three groups based on its level of importance relative to all other management strategies. The printed materials, training programs and advisory board strategies are the highest-priority strategies in the Education and Outreach Program. The remaining seven strategies are medium priority level, and will have some level of activity in year 1. Specific activities within each strategy have also been organized according to implementation priority (Table 10), and are grouped in three categories (high, medium, and low priority). The rankings provide guidance on the types of activities that should be implemented if insufficient funding is available for full implementation. They also provide information about how to schedule the implementation of activities. The priority levels for activities should not be compared across strategies, however, as they only represent the relative importance of the activities within a particular strategy.

Strategy prioritization may change as certain activities are found to be more effective than others. In addition, new strategies and component activities will be established as the program evolves. In all cases, making the maximum use of available resources will be a priority.

**Schedule.** The number of months required to completely implement each strategy and activity in the Education Program is given in Table 10.

**Cost.** The estimated cost of implementing each activity is shown in Table 10. This figure represents the sum of Sanctuary staff salaries, equipment and supplies, general services, and other implementation requirements. The cost of implementing the existing Education Program in Fiscal Year 1992 was \$140,000, including staff salaries and overhead. Over the past five years, the cumulative cost of implementing the Education and Outreach Program was approximately \$450,000. The total estimated cost of implementing all activities in the Sanctuary Education Program is projected to be \$5.2 million over the first five years.

**Geographic Focus.** Most of the activities in the Education and Outreach Program will be implemented Sanctuary-wide, with some limited to the Upper, Middle or Lower Keys. Others would be implemented worldwide, such as providing information to shipping businesses. The specific area targeted by an activity is included in Table 10 when applicable.

**Personnel.** The staff needed to implement the Education and Outreach Program represents a mix of full-time, volunteer, and other agency workers, including interns. Four full-time and one part-time education and outreach staff members are currently working in the Keys. It is estimated that the Keys' Education Program will require 22 full-time employees from NOAA, other agencies, and NGO partnerships. Staff will be distributed among the Upper Keys, Lower Keys, and Marathon sanctuary offices. In addition, one full-time volunteer coordinator (see the Volunteer Action Plan) and approximately 80 volunteers will be needed to adequately implement the strategies in the program. The following steps will be considered so that education and outreach staff as a whole can better meet current educational needs and responsibilities within the FKNMS:

- Positions allocated for education should be maintained as education and outreach positions, and not re-allocated to other areas;

- Vacant positions in education should be filled in as timely a manner as possible, so as not to unduly burden remaining staff; and
- Positions, roles and responsibilities should be clearly defined, based on established workplans and documented needs.

In order to address the multilingual nature of many of the activities, the hiring of a Spanish-speaking education staff member or intern should be given priority consideration.

**Sanctuary Employees.** The Education and Outreach Program will require one program manager (\$42,000 per year), two educational coordinators (\$30,000 per year), five educational assistants (\$16,000 to \$25,000 per year), and 14 interpreters (\$13,000 to \$18,000 per year). Funding for these salaries will come from a combination of NOAA and FDEP resources.

**Interagency Employees.** Eighteen staff members will either be hired through cooperative agreements with other agencies, or employed by other agencies working on education and outreach programs in the Sanctuary. RFP's will be issued to all NGOs when projects can be contracted at the same or lower cost for providing an additional employee.

**Cooperative Agreements.** The education and outreach staff needs may also be met or supplemented through cooperative agreements with others (public, private, individuals). A volunteer coordinator is currently employed jointly by NOAA and TNC.

**Volunteers.** Volunteers will be actively recruited to assist in implementing a variety of Education and Outreach Program activities.

**Equipment.** A variety of equipment will be required to implement many of the activities in the Program. Some are already located at the Key Largo, Looe Key, and Florida Keys national marine sanctuary offices, but numerous items still must be acquired to ensure the success of the program, including a Macintosh computer and a printer able to produce photocopy-ready documents. Mobile presentation materials, such as portable exhibition stands for use at trade shows and conferences, are also needed, as is video production equipment.

**Contingency Planning for Changing Budget.**

If education and outreach allocations fall below the projected requirements, increased private support will

be sought. If private support is not available, projects will be implemented in priority order and/or with recommendations of the Advisory Board.

**Evaluating Program Effectiveness and Efficiency.**

The Education and Outreach Program will be evaluated on an ongoing basis to determine the effectiveness and efficiency of the component activities and to determine the Program's overall performance.

In some cases, background information (e.g., databases) needed to make such evaluations already exists. However, in other cases it may be necessary to conduct statistically sound information-collection efforts to enable useful evaluations.

This evaluation will determine the Program's level of effectiveness by assessing:

- the demand for information, products and programs;
- the level of media exposure;
- the level of awareness of target audiences (relative to the level of need);
- whether the level of compliance with zoning and regulatory provisions increases or decreases;
- public attitudes toward the Sanctuary; and
- the value placed on the natural resources of the local ecosystem.

This evaluation will determine the Program's level of efficiency by assessing:

- the extent the education product is used;
- the extent of participation in education and outreach programs;
- staff compliance with project deadlines; and
- budget costs relative to the products and programs produced.

Table 9. Agencies/Organizations Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies/Organizations														
	NOAA	USEPA	NPS	USFWS	FDEP	FDOEd	FDOE/BAR	Monroe County	Sea Grant	SAC	NPO	Ch. of Com.	TNC	TDC	Academia
<b>COMMUNITY INVOLVEMENT/COMMUNITY PROGRAM</b>															
<b>E.4 Training, Workshops, and School Programs</b>															
Promote/Support Environmental Education in Monroe County and State Schools	●				●	○	●								○
Produce the Florida Keys Environmental Education Directory	●				●										
Provide/Support Environmental Education Workshops for Educators	●	○	○	○	●	○	○	○	○						○
Provide Environmental Education for Law Enforcement Personnel	●				●		○	○							○
Sponsor/Support Adult Environmental Education	●	○			●	○	○	○				○		○	○
Certification Program	●	○	○	○	●		○	○		○	○	○	○	○	○
Provide mechanisms Outside Law Enforcement to Help Deliver On-site Resource Education	●														
<b>E.6 Education Advisory Board</b>															
Establish Education Advisory Board	●	○	○	○	●	○	○	○					○		○
<b>E.10 Public Forum</b>															
Establish a Public Meetings Program	●				●										
Develop a Speakers Bureau and Lecture Series	●	○	○	○	●			○		○	○	○		○	○
Conduct a Poster Contest	●				●	○	○	○		○	○				
Conduct a Photo Contest	●				●					○					
<b>E.11 Special Events</b>															
Develop Trade Show Information Booths	●				●							○			○
Organize Environmental Exposition	●	○	○	○	●		○	○	○	○	○	○	○	○	○
Hold a Grand Opening	●	○			●					○	○				○
Implement Kid's Week	●	○	○	○	●	○	○	○		○	○			○	○
Design and Implement a Sanctuary Awareness Week	●	○			●		○	○		○	○			○	
<b>E.12 Professional Development of Education Staff</b>	●														
<b>PRODUCT DEVELOPMENT</b>															
<b>E.1 Printed Materials</b>															
Design and Print FKNMS Brochure	●				●										
Produce a Monthly FKNMS Newsletter	●				●			○							
Provide Information to Shipping Businesses	●														
Provide Information to Community Leaders/Decision Makers/Organized User Groups	●	○			●		○	○	○	○	○				○
Provide Interpretive Information to Periodicals/Publications	●	○			●		○		○	○	○				○
Provide Information to Businesses about FKNMS Resources and Activities	●				●			○		○	○	○			○

● Lead    ● Primary Role    ○ Assist



Table 9. Agencies/Organizations Identified for Implementing Strategies/Activities (cont.)

Strategy/Activity	Agencies/Organizations														
	NOAA	USEPA	NPS	USFWS	FDEP	FDOEd	FDOs/BAR	Monroe County	Sea Grant	SAC	NPO	Ch. of Com.	TNC	TDC	Academia
<b>E.1 Printed Materials (cont.)</b>															
Provide Multilingual Information to Marine Rental Businesses	●				●			○		○	○				○
Distribute Educational Materials at Public Boat Ramps	●				●			○		○					○
Produce and Distribute Fact Sheet on FKNMS Boating Rules, Regulations and Etiquette with Annual Boat Registration	●				●		○	○							○
Produce FKNMS Fact Sheet for Tourist Development Council	●				●									○	
Distribute Information regarding FKNMS in Utility Bills, Newsletters, and Licenses/Registration	●				●		○								○
Provide Information to Service Industries about Environmentally Safe Practices	●				●			○		○	○	○	○		○
Produce a Color Environmental Atlas for the Sanctuary	●	○	○	○	●		○	○							
<b>E.2 Audio-visual Materials</b>															
Establish Audio and Video Library	●				●							○			
Produce Video and Audio Tapes and Theme-Oriented Slide Presentations	●	○	○	○	●			○		○		○	○	○	○
<b>E.3 Signs/Displays/Exhibits</b>															
Establish Wayside Exhibits in the Florida Keys	●				●		○							○	○
Establish Static Displays at Appropriate Locations	●	○	○	○	●		○	○		○	○	○	○		○
Develop Mobile Displays with Information on All Aspects of the FKNMS Program	●	○			●							○	○		○
Develop Interactive Computer Stations	●	○	○	○	●			○		○				○	
Establish Information "Stations" at South Florida Airports/ Car Rental and Visitor Centers along US 1	●	○	○	○	●			○		○	○	○			
Design and Install Roadside Signs	●				●		○								○
<b>E.5 Public Service Announcements</b>															
Develop a Program of PSAs	●	○	○	○	●			○	○	○				○	○
Develop a Media Packet	●	○			●							○		○	○
Develop and Produce a Series of Video News Releases	●	○			●			○	○	○		○	○	○	○
Print Marine Etiquette on Marine Related Materials Packaging	●	○			●			○	○					○	○
Develop VHF and Dedicated AM Radio Station	●	○	○	○	●			○							

● Lead    ● Primary Role    ○ Assist

Table 9. Agencies/Organizations Identified for Implementing Strategies/Activities (cont.)

Strategy/Activity	Agencies/Organizations															
	NOAA	USEPA	NPS	USFWS	FDEP	FDOfEd	FDOS/BAR	Monroe County	Sea Grant	SAC	NPO	Ch. of Com.	TNC	TDC	Academia	Bing. Imp. Fnd
<b>E.7 Promotional Educational Materials</b>																
Establish Visitor Booths/Displays to Distribute Educational Materials	●				●	○										○
Establish Interagency Visitor Center for Orientation Purposes	●	○	○	○	●			○								

● Lead    ● Primary Role    ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; USEPA, U.S. Environmental Protection Agency; NPS, National Park Service; USFWS, U.S. Fish and Wildlife Service; FDEP, Florida Department of Environmental Protection; FDOfEd, Florida Department of Education; FDOS/BAR, Florida Department of State/Bureau of Archaeological Resources; SAC, Sanctuary Advisory Council; NPO, Nonprofit Organizations; CH. of Com., Chambers of Commerce; TNC, The Nature Conservancy; TDC, Tourist Development Council; Bing. Imp. Fnd, Boating Improvement Fund; Citizens of S. FL., Citizens of South Florida; FK Aque. Auth., Florida Keys Aqueduct Authority; FADO/KADO, Florida Association of Dive Operators/Keys Association of Dive Operators; OFF, Organization of Florida Fisherman; Planning Cncl., Planning Council.

Table 10. Requirements for Implementation

Strategy/Activity	Overall Sanctuary Priority Level	Implementation			Cost to Complete		Geographic Focus	# of Personnel
		Planned Level of Action in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/Maint (\$1,000)		
COMMUNITY INVOLVEMENT/COMMUNITY PROGRAMS								
E.4 Training, Workshops, and School Programs	High	Medium	12+	<50%	NC	100-999		7
Promote/Support Environmental Education in Monroe County and State Schools	High	High	C	100%		10-99	SW	
Produce the Florida Keys Environmental Education Directory	High	Low	8	<50%		<10	SW	
Provide/Support Environmental Education Workshops for Educators	High	Medium	C	<50%		10-99	SW	
Provide Environmental Education for Law Enforcement Personnel	High	Medium	12+	<50%		10-99	SW	
Sponsor/Support Adult Environmental Education	High	Medium	C	<50%		10-99	SW	
Certification Program	Medium	None	12+	<50%		10-99	SW	
Provide mechanisms Outside Law Enforcement to Help Deliver On-site Resource Education								
E.6 Education Advisory Board	High	High	6+	100%	NC	NC		1
Establish Education Advisory Board	High	High	6+	100%		10-99	SW	
E.10 Public Forum	Medium	Low	12+	<50%	<10	100-999		2
Establish a Public Meetings Program	High	Low	2+	<50%		<10	SW	
Develop a Speakers Bureau and Lecture Series	High	Low	7+	<50%		<10	SW	
Conduct a Poster Contest	Low	None	3	<50%		10-99	SW	
Conduct a Photo Contest	Low	None	C	<50%		10-99	SW	
E.11 Special Events	Medium	Low	9+	<50%	<10	10-99		5
Develop Trade Show Information Booths	High	High	C	<50%	<10	<10	SW	
Organize Environmental Exposition	Medium	Low	9	<50%		<10	MK	
Conduct a Grand Opening	Medium	None	3	<50%		<10	MK	
Implement Kid's Week	Medium	None	6+	<50%		10-99	SW	
Design and Implement Sanctuary Awareness Week	Medium	None	9	<50%		10-99	SW	
E.12 Professional Development of Education Staff			C					
PRODUCT DEVELOPMENT								
E.1 Printed Materials	High	Low	C	<50%	<10	10-99		4
Design and Print FKNMS Brochure	High	High	6	<50%	<10	10-99	SW	
Produce a Monthly FKNMS Newsletter	High	Medium	C	<50%		10-99	WW	
Provide Information to Shipping Businesses	High	Low	C	<50%		<10	WW	
Provide Information to Community Leaders/Decision Makers/Organized User Groups	High	Low	C	<50%		<10	SW	
Provide Interpretive Information to Periodicals/Publications	High	Low	C	<50%		<10	WW	
Provide Information to Businesses about FKNMS Resources and Activities	High	Low	C	<50%		<10	SW	

Abbreviations: Maint., Maintenance; C, Continuous; NC, No cost; WW, World Wide; SW, Sanctuary Wide; UK, Upper Keys; MK, Middle Keys; LK, Lower Keys

Note: The priority levels for activities should not be compared across strategies—they only represent the relative importance of activities contained within a strategy.

Table 10. Requirements for Implementation (cont.)

Strategy/Activity	Overall Sanctuary Priority Level	Implementation			Cost to Complete		Geographic Focus	# of Personnel
		Planned Level of Action in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/Maint. (\$1,000)		
PRODUCT DEVELOPMENT								
E.1 Printed Materials (cont.)								
Provide Multilingual Information to Marine Rental Businesses	High	Low	C	<50%		<10	SW	
Distribute Educational Materials at Public Boat Ramps	High	Low	C	<50%	<10	<10	SW	
Produce and Distribute Fact Sheet on FKNMS Boating Rules, Regulations and Etiquette with Annual Boat Registration	Medium	Low	C	<50%		<10	SW	
Produce FKNMS Fact Sheet for Tourist Development Council	Medium	None	6+	<50%		<10	SW	
Distribute Information regarding FKNMS in Utility Bills, Newsletters, and Licenses/Registration	Medium	None	C	<50%		<10	SW	
Provide Information to Service Industries about Environmentally Safe Practices	Low	None	C	<50%		<10	SW	
Produce a Color Environmental Atlas for the Sanctuary	Low	None	12	<50%		<10	SW	
E.2 Audio-visual Materials								
Establish Audio and Video Library	High	Low	3	<50%		<10	SW	
Produce Video and Audio Tapes and Theme-Oriented Slide Presentations	Medium	Medium	C	<50%	10-99	10-99	SW	2
E.3 Signs/Displays/Exhibits								
Establish Wayside Exhibits in the Florida Keys	High	High	6	50-74%	10-99	<10	SW	
Establish Static Displays at Appropriate Locations	High	Low	12	<50%		10-99	SW	
Develop Mobile Displays with Information on All Aspects of the FKNMS Program	High	Medium	36	<50%		10-99	SW	
Develop Interactive Computer Stations	High	Low	12	<50%	10-99	10-99	SW	
Establish Information "Stations" at South Florida Airports/ Car Rental and Visitor Centers along US 1	Low	None	24	<50%		10-99	SW	
Design and Install Roadside Signs	Low	Medium	9	<50%	10-99	10-99	SW	
E.5 PSAs								
Develop a Program of PSAs	High	Medium	C	<50%		10-99	SW	
Develop a Media Packet	High	Low	6+	<50%		10-99	SW	
Develop and Produce a Series of Video News Releases	High	Low	18+	<50%	<10	10-99	SW	
Print Marine Etiquette on Marine Related Materials Packaging	Low	None	12	<50%		<10	SW	
Develop VHF and Dedicated AM Radio Station	High	None	60+	<50%	10-99	10-99	SW	2

Abbreviations: Maint., Maintenance; C, Continuous; NC, No cost; WW, World Wide; SW, Sanctuary Wide; UK, Upper Keys; MK, Middle Keys; LK, Lower Keys

Note: The priority levels for activities should not be compared across strategies—they only represent the relative importance of activities contained within a strategy.

Table 10. Requirements for Implementation (cont.)

Strategy/Activity	Overall Sanctuary Priority Level	Implementation			Cost to Complete		Geographic Focus	
		Planned Level of Action in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/Maint. (\$1,000)		# of Personnel
<b>E.7 Promotional Educational Materials</b>	Medium	Low	48	<50%	1,000-5,000	100-999		2
Establish Visitor Booths/Displays to Distribute Educational Materials	Medium	Low	12	<50%	<10	10-99	SW	
Establish Interagency Visitor Center for Orientation Purposes	High	None	48	<50%	1,000-5,000	100-999	UK	

Abbreviations: Maint., Maintenance; C, Continuous; NC, No cost; WW, World Wide; SW, Sanctuary Wide; UK, Upper Keys; MK, Middle Keys; LK, Lower Keys

Note: The priority levels for activities should not be compared across strategies—they only represent the relative importance of activities contained within a strategy.

# Enforcement Action Plan

***This action plan identifies and describes the requirements to develop and implement an enforcement plan for the Sanctuary. The plan is composed of two strategies: Additional Enforcement (B.6) and Cross-deputization (B.12). For each strategy, the time required for implementation, funding availability, costs, and responsible parties are outlined (Table 11).***

## Introduction

NOAA's primary law enforcement objective in the Sanctuary is to achieve resource protection by gaining compliance with the Sanctuary regulations and other Federal and State statutes that apply within the FKNMS. NOAA is also concerned with effective enforcement of all Federal, State, and local statutes that protect the natural, cultural, and historical resources within the FKNMS.

Besides the NMSA, NOAA has sole or shared primary jurisdiction for the Magnuson Fishery Conservation and Management Act (MFCMA), the Atlantic Tunas Convention Act (ATCA), the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Lacey Act (LA), all of which apply to resources residing within or transiting through the FKNMS. In addition, numerous State and local laws will be enforced as part of the Sanctuary's integrated enforcement effort. How effectively these laws are enforced within and around the FKNMS will affect the success of Sanctuary management in conserving and protecting the resources.

Among Federal conservation laws enforced primarily by other agencies, but of concern to NOAA, are the Oil Pollution Act (OPA), the Clean Water Act (CWA), the Marine Plastic Pollution Research and Control Act (MPPRCA), the Abandoned Shipwreck Act

(ASA), the Archaeological Resources Protection Act (ARPA), and the Migratory Bird Treaty Act (MBTA).

An Enforcement Program is one of the tools available to managers of marine protected areas. This program can complement other management programs (e.g., research and education), and lead to an increased level of success. Successful enforcement in the Sanctuary will require a coordinated inter/intra-agency effort. Furthermore, it will require resource managers to commit to Enforcement Programs that are properly supervised and funded. Combined with proper recruitment, training, equipment, policy, and guidelines, these criteria form the basis of a professional law enforcement operation.

***How the Plan is Organized.*** This action plan is organized into three sections: an introduction, description of strategies, and implementation. The introduction summarizes the goals and objectives of the interpretive Enforcement Program and provides background information on planning efforts. The strategy description section groups activities by strategies. For each strategy and component activity, funding availability, costs, and timing of implementation are presented. It also describes how strategies in the plan will be placed into action. The implementation section summarizes the requirements for Sanctuary enforcement.

## Sanctuary Enforcement Requirements

Since 1980, the Enforcement Programs and all other management programs at the two Florida Sanctuaries have been fully funded through a cooperative agreement with the State of Florida. The seven Sanctuary officers currently working in the Key Largo and Looe Key National Marine Sanctuaries are State employees. Sanctuary officers are assigned to the

Table 11. Summary of Enforcement Strategies

Page	Strategies	Overall Sanctuary Priority Level	Planned Level of Action in Year 1	Months to Complete	Funding for Full Implementation	Number of Activities to be Undertaken	Number of Institutions
91	Enforcement Program						
91	B.6 Additional Enforcement	High	Low	36+	<50%	4	7
92	B.12 Cross-deputization	High	Low	36+	75-99%	3	7

FDEP's Division of Law Enforcement, Florida Marine Patrol (FMP) with their supervision coordinated among NOAA, Florida Division of Marine Resources (FDMR), and the FMP. In addition to State laws and local ordinances, Sanctuary officers have statutory or delegated authority to enforce the NMSA and other statutes administered by NOAA.

**Enforcement Philosophy** The Law Enforcement Program of the FKNMS is an essential component of resource protection within the Sanctuary. A goal of Sanctuary enforcement is to prevent resource impacts. This preventive enforcement is best achieved by maintaining sufficient patrol presence within the Sanctuary to deter violations and by preventing, through education, inadvertent violations of the law. Successful enforcement relies on frequent

water patrols and routine vessel boardings and inspections. Water patrols will ensure that users of Sanctuary resources are familiar with the regulations, deter willful or inadvertent violations of the law, and provide quick response to violations and/or emergencies. Sanctuary officers have the capability to investigate, document, and assess Sanctuary violations.

Sanctuary officers practice a form of law enforcement known as "interpretive enforcement." This style of enforcement seeks voluntary compliance primarily through education of users. Interpretive law enforcement emphasizes informing the public through educational messages and literature about responsible behavior, before they adversely impact Sanctuary resources. On-site techniques are currently used to reach the public with educational messages at the

### Enforcement Assets

Current enforcement within the FKNMS relies on a State-Federal partnership, utilizing all available enforcement assets of several agencies. The State of Florida, Florida Marine Patrol (FMP), Florida Park Service (FPS), NOAA, U.S. Coast Guard (USCG), and the U.S. Fish and Wildlife Service (FWS) have personnel operating in the FKNMS with statutory or delegated authority to enforce State laws, the National Marine Sanctuaries Act (NMSA), other NOAA statutes, and other acts. The National Park Service (NPS) has enforcement personnel in areas bordering the FKNMS. Land-based enforcement officials work for the Monroe County Sheriff's Office, the U.S. Army Corps of Engineers (ACOE), U.S. Customs, and Florida Game and Fresh Water Fish Commission (FGFWFC). Other Federal and State law enforcement agencies have officers based in the Keys, but do not regularly interact with Sanctuary officers. Some of these include: the State of Florida Department of Transportation; Drug Enforcement Agency; and Bureau of Alcohol, Tobacco, and Firearms.

A summary of the general enforcement assets for agencies conducting enforcement activity within the FKNMS is as follows:

**Sanctuary Enforcement Officers.** Currently seven Sanctuary Officers, funded by NOAA through an existing cooperative agreement, enforce regulations in the FKNMS. These are sworn, arms-bearing State of Florida Law Enforcement Officers who are deputized to enforce the NMSA, the Magnuson Fishery Conservation and Management Act (MFCMA), the Marine Mammal and Protection Act (MMPA), and the Endangered Species Act (ESA), as well as all State laws.

Sanctuary Officers report directly to an FMP Sanctuary Lieutenant, who in turn coordinates enforcement activities with the Sanctuary Agent and FMP Sanctuary

Officers are equipped with high performance vessels obtained from U.S. Customs seizures and provided by NOAA. Each vessel is equipped with electronic equipment (e.g. Loran, VHF radio, low band State and Federal radio) and emergency response equipment.

**NOAA (Office of Enforcement).** NOAA currently has one Special Agent assigned to the Florida Keys and another assigned to Miami. Both Agents are assigned to the National Marine Fisheries Service (NMFS), but provide assistance to the Sanctuary enforcement effort on an as-needed basis. Special Agents provide training to Coast Guard personnel and FMP officers in the enforcement of some NOAA statutes, primarily the MFCMA, the MMPA, and the ESA. NOAA has assigned a Sanctuary Special Agent with specific responsibilities for Sanctuary enforcement to the FKNMS. The Sanctuary Agent will be responsible for ensuring that NOAA's enforcement needs are met by the agencies funded through cooperative agreements for enforcement activity within the Sanctuary. The Office of Enforcement has Agents assigned throughout Florida, and in southern Georgia, who are available for special operations within the FKNMS on an as-needed, as-available basis.

**Florida Marine Patrol.** The FMP has an authorized force of 45 sworn enforcement officers and support personnel assigned to the district that includes the FKNMS. The FMP has available for Sanctuary enforcement small vessels for inshore patrols, a 50-foot patrol boat for offshore patrols, and a single engine sea plane. The FMP also maintains a response team that includes divers who can assist in damage assessment efforts. FMP uses an 800 MHz communications system to enhance enforcement effectiveness.

Under an interagency agreement with NOAA, all sworn FMP officers will be deputized to enforce the NMSA inside the FKNMS, as well as other NOAA statutes

existing sanctuaries. For example, Sanctuary officers talk with users and distribute brochures in the field. These encounters allow officers to make direct, informative contact with visitors, while conducting routine enforcement activity. In addition, Sanctuary officers are called upon to deliver interpretive programs both on-site and throughout the community. Sanctuary officers will continue to perform interpretive law enforcement within the FKNMS.

**Integrating Enforcement Efforts** Across the nation, Federal, State, and local agencies are increasingly joining forces and targeting whole coastal ecosystems including rivers, bays, estuaries, and coastlines for comprehensive management and enforcement actions. Federal, State, and local laws provide government agencies with a variety of tools to protect

coastal resources. In so doing, these laws strengthen law enforcement capabilities by allowing agencies to build on each other's expertise and share physical resources. Federal, State, and local agencies in the Keys are implementing this process of integrating efforts. In addition, local residents and frequent Sanctuary users are helping by detecting and reporting various violations and groundings, monitoring water quality, and submitting witness statement forms that document Sanctuary violations.

The success of Sanctuary enforcement depends largely on how well the enforcement entities in the Keys are coordinated. Because of limited resources at the Federal, State, and local levels, current enforcement assets must be targeted and used in an efficient and directed effort to achieve compliance.

within and outside the Sanctuary boundaries. FMP officers also enforce a variety of State statutes related to resource protection and public safety.

**National Park Service** The NPS has enforcement personnel stationed at Key Biscayne National Park, Everglades National Park and Dry Tortugas National Park. All three areas share boundaries with the FKNMS. NPS enforcement personnel will be deputized to enforce NOAA statutes.

**U.S. Fish and Wildlife Service** Along with NOAA Special Agents, FWS Special Agents and officers have statutory authority to enforce the MMPA, ESA, the Bald and Golden Eagle Protection Act, and the Lacey Act. FWS also enforces the MBTA and other resource conservation laws within the boundaries of the FKNMS. FWS has five officers stationed in the area of the FKNMS who will be deputized to enforce the NMSA.

**United States Coast Guard** The USCG Seventh District has responsibility for the area which includes the FKNMS. The Coast Guard has general law enforcement authority within the maritime jurisdiction of the United States. Coast Guard law enforcement patrols are usually multi-mission in nature, although patrols often emphasize enforcement of particular statutes. Typically, the Coast Guard depends on those agencies with specialized expertise to provide their patrol units with training and support in the conduct of law enforcement activities.

Within the FKNMS, the Coast Guard conducts between 2,400 to 2,500 hours of surface patrols and 200 to 300 hours of aerial patrols per year dedicated to enforcement.

The Coast Guard also has a primary role in protecting

natural resources under the Oil Pollution Act of 1990, the Rivers and Harbors Act of 1899, the Deepwater Port Act, the Clean Water Act of 1977, and the Marine Plastic Pollution Research and Control Act.

**Department of Environmental Protection, Florida Park Service** State parks in the Keys are unique in that their boundaries, including any waters they protect, are incorporated into the FKNMS boundaries. Florida Park Service officers are under the DEP Division of Law Enforcement and have the same jurisdiction as the Florida Marine Patrol. The officers conduct regular water patrols within park or aquatic preserve boundaries and may be available for assistance when necessary.

**John Pennekamp Coral Reef State Park (JPCRSP)** has a small land base with water boundaries extending from mean high tide out to the three-mile limit. The park borders Biscayne National Park to the north and extends approximately 22 miles south. JPCRSP's three-mile limit boundary is immediately adjacent to the boundaries of the Key Largo National Marine Sanctuary. The boat fleet for JPCRSP consists of research vessels and patrol boats. The officers patrol the park waters on a regular basis.

**Monroe County Sheriff's Office (SO)** Although the SO is primarily land based, they regularly use three boats for water patrol in excess of 16 patrol hours per month. The SO willingly assists the FMP in special events (e.g., boat races or movies) and the opening day of lobster season, and has jurisdiction within State waters. The officers have crossover training with U.S. Customs. There are currently three environmental officers, three to five person dive teams available for emergency response, and two planes for aerial patrol.



## *Action Plans: Enforcement*

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with existing (Federal, State, and local) and proposed regulations. Consequently, the coordination of enforcement assets will be an integral component of the continuous management process described in this Plan. Interagency agreements among NOAA and the other enforcement entities in the Keys (National Park Service (NPS), U.S. Coast Guard (USCG), U.S. Fish and Wildlife Service (FWS), Florida Department of Environmental Protection (FDEP), including Florida Park Service (FPS) and Florida Game and Fresh Water Fish Commission (FGFWFC)), are being established to ensure a cooperative and integrated enforcement operation.

A clear vision of the interagency mission and an understanding of the assets and resources currently available for an interagency effort to manage Sanctuary resources is essential to successfully managing the FKNMS. An assessment of existing Federal, State, and local enforcement assets in the Keys will be conducted. This assessment will develop detailed information about the number of officers, vessels, and equipment available by agency to protect resources within the Keys. This is essential information to determine the capabilities of enforcement operations within the Keys.

**Conduct of the Enforcement Program.** Sanctuary enforcement operations are a major component of Sanctuary management. A NOAA/National Marine Fisheries Service (NMFS) Special Agent (Sanctuary Agent) will serve as coordinator of the operational Enforcement Program on behalf of, and working in close consultation with, the Sanctuary Superintendent. The Sanctuary Agent is provided through an existing memorandum of understanding between the Assistant Administrator for Fisheries and the Assistant Administrator for Ocean Services and Coastal Zone Management. The Sanctuary Agent will coordinate operational enforcement with all participating agencies through their respective chains of command. Enforcement will be conducted in accordance with enforcement operations plans, to be developed by NOAA's Office of Enforcement and approved by Sanctuary management. Enforcement operations plans, subject to revision as necessary, will include enforcement priorities, patrol schedules, procedures for documenting violations, boarding procedures, information needs, and other instructions specific to the conduct of day-to-day enforcement.

The Sanctuary Agent will coordinate patrol schedules, enforcement priorities, and other related enforcement matters with the Sanctuary Lieutenant. The Agent will in turn coordinate with the Sanctuary officers through their FMP chain of command. The

success of the Sanctuary enforcement effort depends on the level of cooperation among Sanctuary management and the enforcement staff. This kind of cooperative enforcement is not a new concept in the FKNMS. From the outset, all enforcement in the Looe Key and Key Largo National Marine Sanctuaries has been conducted by State law enforcement officers, under the direction of NOAA and State managers.

**Operational Considerations.** The Sanctuary Agent is stationed at the Marathon office. The seven current Sanctuary officers will be assigned to patrol the Upper, Middle, and Lower Keys, with emphasis placed on patrols in the Sanctuary Preservation Areas and Ecological Reserves. Patrol priorities will be based primarily on the protection of resources as opposed to user conflicts.

The Sanctuary officers will be stationed in the Upper, Middle and Lower Keys. Each officer (current and future) will be outfitted with a vehicle, a patrol boat, and all required law enforcement equipment (weapons, etc.).

Currently, the annual cost to NOAA for the Enforcement Programs at the Key Largo and Looe Key National Marine Sanctuaries is \$610,000. This figure does not include the purchase cost of patrol vessels, but does include operations and maintenance costs.

**Enforcement Program Review.** As part of the continuous management process, an enforcement review program will be established for the Sanctuary. This program will ensure that management issues are being addressed by all agencies involved in Sanctuary enforcement, and that the proper training and marine resource identification and protection information is reaching the enforcement staff.

## **Background**

**Management Strategies.** The strategies for the Management Plan, which includes the Enforcement Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Enforcement Action Plan Strategies.** This action plan contains only two strategies. The Additional Enforcement (B.6) and Cross-deputization (B.12) strategies are included in high priority level (Table 13). Overall, the Enforcement and the Cross-deputization strategies will have a low level of implementation within the first year of Sanctuary operation.

### **Program Objectives**

The objective of enforcement in the National Marine Sanctuary Program is to protect Sanctuary resources by achieving compliance with the applicable laws. Effective enforcement of all Federal, State, and local statutes that protect the natural, cultural, and historical resources within the Sanctuary is required. The principal goals associated with Sanctuary enforcement include:

- increasing the public's understanding of why it is important to comply with Sanctuary regulations;
- achieving voluntary compliance with applicable laws; and
- promoting public stewardship of the marine resources through interpretive enforcement efforts.

The mechanisms for accomplishing these goals are as follows:

#### *Agreements/Cooperative Efforts*

- strengthen the existing enforcement partnership with the State of Florida;
- develop partnerships with other Federal and local enforcement agencies in order to provide a strong enforcement presence throughout the Sanctuary;
- maintain an active relationship with international, Federal, State, and local enforcement agencies to identify areas of mutual concern, and to develop cooperative responses to enforcement issues;
- explore cooperative relationships with foreign governments;
- enter, if necessary, into memoranda of understanding, cooperative enforcement agree-

ments, and joint operations plans with other enforcement agencies as appropriate;

- facilitate communication among enforcement assets to avoid duplication of effort;
- promote cooperation, standardization of gear, and coordination of limited resources such as vessels, radios, radio frequencies, and training;
- promote training and cross-deputization among enforcement agencies;

#### *Community Involvement*

- encourage public involvement by encouraging site-specific interpretive patrols by volunteer groups;
- involve USCG, Civil Aeronautical Patrol, power squadrons, charter boat and fishing organizations in promoting compliance with Sanctuary regulations;
- maintain an active relationship with citizen groups interested in compliance with Sanctuary regulations;
- conduct a community outreach program to encourage compliance with Sanctuary regulations and citizen involvement in reporting violations;
- establish a Sanctuary Auxiliary Officer Program similar to other enforcement auxiliaries;

#### *Education*

- emphasize education as a tool to achieve compliance with regulations;
- promote voluntary compliance and stewardship of the general public through specific outreach programs regarding enforcement of Sanctuary regulations;
- train user groups about regulations and procedures for reporting violations (witness statement forms);
- identify major user groups and develop and disseminate specific materials to these groups through semiannual meetings and workshops;

*Operations*

- maintain an investigative capability to ensure quick response to purposeful unlawful acts;
- develop and maintain the capability to effectively respond to violations of Sanctuary regulations and to emergencies;
- establish an Enforcement Advisory Committee consisting of relevant regional law enforcement organizations (possibly a reorganization of the Environmental Enforcement Task Force and the Upper Keys Emergency Response Task Force);
- develop enforcement operation plans that identify specific enforcement strategies and priorities and outline the best means of achieving them; and
- develop regulations for the FKNMS that are comprehensible to the general public and are easily enforced.

## Description of Strategies

### Enforcement Program

The Enforcement Action Plan contains two management strategies. The first strategy (B.6) calls for increasing the enforcement assets by 30 officers, identifying high-use and sensitive areas, and developing remote observation techniques to aid enforcement efforts. The second strategy (B.12) will enhance existing enforcement efforts by cross-deputizing officers from different agencies, developing standard operating procedures, and establishing a training program. These strategies will essentially provide the resources necessary to achieve compliance with applicable regulations.

#### Enforcement Strategies

##### B.6: Additional Enforcement

- Hire Sanctuary agent
- Identify high-use and sensitive areas
- Hire additional enforcement officers
- Develop remote observation techniques to aid enforcement efforts

##### B.12: Cross-deputization

- Develop inter-agency agreements
- Develop standard operating procedures
- Develop a standardized training program

### Strategy B.6: Additional Enforcement

Need 30 Sanctuary enforcement officers to deploy in high-use and sensitive areas.

*(Priority Level High, Low Level of Action in Year 1, 36+ Months to Complete, <50% Funding for Full Implementation)*

This strategy will increase the presence of law enforcement officers (LEO) on the water to protect resources and reduce user conflicts. This will be accomplished by hiring 30 more LEOs and deploying them in high-use and sensitive areas. Remote observation techniques may be used to aid enforcement efforts. High-use and sensitive areas will be identified.

**Activity 1-Hire the Sanctuary Agent.** The National Marine Fisheries Service's (NMFS) Office of Enforcement has assigned to the FKNMS headquarters a NOAA/NMFS Special Agent (Sanctuary Agent) to coordinate operational enforcement within the FKNMS. Working in close cooperation with the Sanctuary Superintendent, regional managers and representatives from the FMP, the USCG, and, when appropriate, the NPS and FWS, the Agent will develop annual enforcement operations plans, including necessary revisions and updates of the plan throughout the year. These plans will include a summary of relevant regulations; a planned patrol schedule to include the number, type, frequency, and geographic area of the patrols; the priority for each patrol; and a response protocol for each type of violation. The Agent will also—

- ensure that case reports of violations of the NMSA or other NOAA statutes are complete and meet prosecutorial requirements before forwarding them to the NOAA general counsel;
- ensure that all officers enforcing NOAA statutes within the FKNMS are properly deputized and have up-to-date training; and
- serve as NOAA's point of contact within the FKNMS for operational enforcement with other federal and state enforcement agencies. In this role, the Sanctuary Agent will facilitate communication among all enforcement participants.

■ **Implementation.** The Sanctuary Agent has been assigned to the Sanctuary by the Office of Enforcement (NMFS).

■ **Schedule.** This activity has been completed.

#### Activity 2-Identify High-use and Sensitive Areas.

Because of the size of the Sanctuary, enforcement officers (including new hires) will be assigned primarily to high-use and sensitive areas, with priorities based on the protection of resources over the resolution of user conflicts. These areas may include all or some of the Sanctuary zones (Sanctuary Preservation Areas, Ecological Reserves, Wildlife Management Areas, Special-use Areas, and Existing Management Areas), as well as other areas of particular natural/cultural resource significance. Determination of sensitive cultural significance is part of the SCR inventory objective. High-use and sensitive areas must be identified prior to assigning additional enforcement officers to cover these areas. This is critical, because new officers will be phased in over a multi-year period.

## *Action Plans: Enforcement*

Sanctuary managers must assess the law enforcement needs of the areas they manage. The costs of training, retraining, firearms qualifications, equipment, maintenance, and the staff necessary to manage a program must be considered when assessing the law enforcement needs of the Sanctuary.

Resources should be inventoried, and priorities assigned to their protection, based on an assessment of their significance and vulnerability. The numbers of visitors, visitor demographics, average length of stay, length of commercial and recreational seasons, seasonal variations, and visitation trends all greatly affect the amount and type of law enforcement services required. The variety and impacts of public use and special events or seasons are major influences on the scope of the Sanctuary's Enforcement Program. Access, circulation patterns, and high-use areas all have significant impacts on the Sanctuary's Enforcement Program. Recent overflight surveys will provide data to assist in identifying high-use and sensitive areas needing specific enforcement efforts.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FMP will assist in identifying high-use and sensitive areas and enforcement levels.

■**Schedule.** This activity will have a low level of activity in year 1. It will require 6+ months to complete.

**Activity 3-Hire Additional Enforcement Officers.** Once high-use and sensitive areas are identified, an adequate level of enforcement must be determined and the corresponding officers hired. Given current funding limitations, additional officers will be phased in over a multi-year period.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity.

■**Schedule.** This activity will have a low level of activity in year 1. It will be continuous.

**Activity 4-Develop Remote Observation Techniques to Aid Enforcement Efforts.** Floatplanes, tethered aerostats, etc. may be used to aid enforcement efforts.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity, with the assistance of other enforcement agencies.

■**Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

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## **Strategy B.12: Cross-deputization**

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Expand Federal, State, and local enforcement and cross-deputization programs and prioritize enforcement areas.

*(Priority Level High, Low Level of Action in Year 1, 36+ Months to Complete, 75-99% Funding for Full Implementation)*

**Activity 1-Develop Interagency Agreements Establishing Cross-agency Enforcement Authority.** A prerequisite to effective Sanctuary enforcement is the establishment of interagency agreements with various enforcement entities in the Keys. These agreements will set forth Federal, State, and local enforcement authority among all officers. *It is anticipated that officers with the following organizations will be cross-deputized:*

**National Marine Fisheries Service.** As a result of a March 1993 agreement between the National Ocean Service (NOS) and NMFS, the Sanctuary Agent (Office of Enforcement, NMFS), in close consultation with the Sanctuary Superintendent and the Sanctuary Lieutenant, will coordinate all enforcement operations within the FKNMS.

**Florida Marine Patrol.** The Sanctuary enforcement staff at the Key Largo and Looe Key national marine sanctuaries are supervised by the FMP under an agreement that allows these officers to enforce NMSA and other NOAA statutes. A new interagency agreement will allow all other FMP officers to enforce statutes that apply within the entire Sanctuary, including the NMSA and other relevant Federal statutes. As such, FMP officers (Sanctuary and non-Sanctuary officers) will be the primary enforcement asset in the Sanctuary.

*Note: The enforcement abilities of the Department of Environmental Protection's Division of Law Enforcement are subject to the operational parameters of that law enforcement entity, and may be limited by the levels of staffing and funding proposed by this plan. Accordingly, the designation of the FMP as the primary enforcement asset in the Sanctuary may be subject to change.*

Interagency agreements are being established between NOAA and the following entities to allow their officers to enforce NMSA and other statutes administered by NOAA:

- U.S. Coast Guard;
- U.S. Fish and Wildlife Service;
- National Park Service;
- Florida Department of Environmental Protection (Florida Park Service); and
- Florida Game and Fresh Water Fish Commission.

■**Implementation.** NOAA is the lead agency responsible for establishing interagency agreements with the agencies listed above.

■**Schedule.** This activity has a high level of action planned for year 1. It will require 12+ months to complete.

**Activity 2-Develop Standard Operating Procedures.** This will increase the efficiency and effectiveness of enforcement efforts. It will establish coordination and cooperation among agencies and increase interagency communication by:

- scheduling staff and equipment efficiently among all agencies;
- developing a process for handling violations;
- standardizing radio communications (i.e., use of a standard radio frequency);
- promoting cooperation with the military in detecting violations; and
- determining priority enforcement areas (establishing interagency agreements and identifying priority areas are prerequisites).

■**Implementation.** NOAA's Sanctuary Agent will be responsible for implementing this activity by coordinating with affected agencies.

■**Schedule.** This activity has no action planned for year 1. It will require 24 months to complete.

**Activity 3-Develop a Standardized Training**

**Program.** A training program will be developed to enable various enforcement agencies to educate each other about their respective statutes and codes.

■**Implementation.** NOAA's Sanctuary Agent and the Sanctuary Superintendent and/or education staff will be responsible for implementing this activity by developing a standard training course on the enforcement of the NMSA, MFCMA, MMPA, and ESA. The Sanctuary should also coordinate with the National Park Service and other federal/state training programs on enforcement of archaeological and historic preservation laws. The FMP will be responsible for developing a course on the Florida statutes and Monroe County codes.

■**Schedule.** This activity has no action planned for year 1. It will require 36+ months to complete.

## Implementation

*This section summarizes key information about the implementation of the strategies included in this plan. The institutions responsible for each activity, and those agencies providing some level of assistance, are identified (Table 12). The strategies are also ranked to indicate their overall priority level. In addition, the planned level of activity in year 1, months required to complete, funding availability, cost estimates, staff requirements, and the geographic focus of each strategy/activity are provided (Table 13). Finally, the process used to evaluate the effectiveness of the program as it evolves over time is presented.*

The strategies in this plan will have a low level of action during the first year. Funding will be a major consideration, given that many different agencies will be involved to different degrees.

**Responsible Institutions.** NOAA will be the lead agency responsible for implementing the activities within this action plan. However, the success of the Enforcement Program depends on the cooperation of other State and Federal agencies, primarily the FDEP, FMP, FPS, FGFWFC, USFWS, USCG, NPS, and Monroe County.

**Prioritization of Implementation.** Because of their importance, the Cross-deputization strategy and the Additional Enforcement strategy are included in high priority level. Consequently, they are included among the highest-ranking strategies in the Management Plan.

**Cost.** The costs associated with implementing this action plan are estimated to be significant (up to \$1 million in capital costs and an additional \$1 million for operation and maintenance costs). These costs are primarily associated with hiring additional officers (i.e., salaries and equipment), and will be distributed among the participating institutions. The funding will come primarily from the various Federal agencies' enforcement budgets and State funds.

**Geographic Focus.** Each strategy in this plan will be implemented throughout the Sanctuary.

**Staff.** A staff of two full-time Sanctuary personnel (including the Sanctuary Agent) will be needed to:

- coordinate the interaction of the various enforcement assets in the Sanctuary; and

Table 12. Agencies/Organizations Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies/Organizations					
	NOAA-Sanctuary	NOAA-NMFS	FWS	USCG	NPS	FDEP-FMP
<b>ENFORCEMENT PROGRAM</b>						
<b>B.6 Additional Enforcement:</b>						
Hire the Sanctuary Agent	●	●				
Identify High-use and Sensitive Areas	●	●	○	○	○	○
Hire Additional Enforcement Officers	●	●			○	
Develop Remote Observation Techniques to Aid Enforcement Efforts		●	○	○	○	○
<b>B.12 Cross-deputization</b>						
Develop Interagency Agreements	●	○	○	○	○	○
Develop Standard Operating Procedures	○	●	○	○	○	○
Develop Standardized Training	●	●	○	○	○	○

● Lead    ○ Primary Role    ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; NMFS, National Marine Fisheries Service; FWS, U.S. Fish and Wildlife Service; USCG, U.S. Coast Guard; NPS, National Park Service; FDEP, Florida Department of Environmental Protection; FMP, Florida Marine Patrol.

- oversee the enforcement officers. This plan calls for the hiring of up to 30 additional enforcement officers.

**Equipment.** If 30 additional officers are hired, each will require a high performance vessel. Each officer will have to be equipped with enforcement gear at approximately \$1,500 per officer. Each officer must initially attend the FMP Law Enforcement Academy and then participate in the Academy's annual training program.

**Evaluating Program Effectiveness and Efficiency.** A system will be designed for evaluating the effectiveness of enforcement efforts. Evaluating efficiency will be done on a monthly and annual basis on both a regional and Sanctuary-wide scale. The regional managers will assess enforcement efforts in known hot spots and coordinate enforcement coverage accordingly. On a yearly basis, the heads of the various enforcement agencies will meet to discuss enforcement issues, including whether heavily used and sensitive areas are being adequately patrolled.

Table 13. Requirements for Implementation

Strategy/Activity	Overall Sanctuary Priority Level +	Implementation			Cost to Complete		Geographic Focus	# of Personnel
		Planned Level of Action In Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/ Maint.(\$1,000)		
ENFORCEMENT PROGRAM								
B.6 Additional Enforcement	High	Low	36+	<50%	100-999	100-999		30
Hire the Sanctuary Agent	*	--	--	100%	0	10-99	SW	
Identify High-use and Sensitive Areas	High	Low	6+	75-99%	0	<10	SW	
Hire Additional Enforcement Officers	Medium	Low	C	<50%	100-999	100-999	SW	
Develop Remote Observation Techniques to Aid Enforcement Efforts	Low	None	36+	<50%	10-99	10-99	SW	
B.12 Cross-deputization	High	Low	36+	75-99%	<10	10-99		5
Develop Interagency Agreements	High	High	12+	75-99%	0	<10	SW	
Develop Standard Operating Procedures	Medium	None	24+	<50%	0	<10	SW	
Develop Standardized Training Program	Medium	None	36+	<50%	0	<10	SW	

Abbreviations: C, Continuous; SW, Sanctuary Wide; Maint., Maintenance.

+ Activities with an "\*" for Overall Sanctuary Priority Level will be completed prior to Year 1.



# Mooring Buoy Action Plan

*This action plan identifies and describes the strategies needed to develop and implement a comprehensive mooring buoy siting plan for the Sanctuary. The strategies within the plan are derived from Alternative III, the most balanced of the mid-range management alternatives. For each strategy, the time required for implementation, funding availability, costs, and responsible parties are outlined. Table 14 summarizes key information about the implementation of the strategies included in this plan.*

## Introduction

Mooring buoys have been shown to be an effective management tool when used to minimize the damage to coral reefs and other sensitive marine resources resulting from careless and/or inappropriate anchoring practices. A system of mooring buoys is already in use in the Keys through the efforts of Key Largo and Looe Key national marine sanctuaries and several volunteer groups, most prominently Reef Relief in Key West. However, concerns that the inappropriate use of mooring buoys may have the potential to negatively impact marine resources by attracting more boaters, divers, and fishermen than would have previously used the areas where they are placed have been raised recently. This plan will establish a methodology for identifying areas appropriate for locating mooring buoys and managing boating activities near coral reefs so that the negative impacts will be minimized.

**How the Plan is Organized.** This action plan is organized into three sections: an introduction, description of strategies, and implementation. The introduction summarizes the goals and objectives of the Mooring Buoy Program and provides background information on planning efforts. The strategy description section groups activities by strategy. For each

strategy and component activity, the priority level, funding availability, costs, and timing of implementation are summarized. The implementation section details how strategies in the plan will be placed into action.

## Background

**Management Strategies.** Each strategy in the action plan has been assigned an estimated activity level for year 1 (high, medium, low, or none) which represents an estimate of the planned level of action that will occur in the year after the Sanctuary Management Plan is adopted. In addition, the time required for implementation, costs of implementation, and available funding (Federal, State, local, and private) have been estimated for each strategy. The component activities in each strategy, and the institutions responsible for implementing these activities, have been identified as well.

The strategies for the Management Plan, which includes the Mooring Buoy Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Mooring Buoy Action Plan Strategies.** The Boat Access (B.1) strategy is completed, as indicated in

Table 14. Summary of Mooring Buoy Strategies

Page	Strategies	Overall Sanctuary Priority Level	Planned Level of Action in Year 1	Months to Complete	Funding for Full Implementation	Number of Activities to be Undertaken	Number of Institutions
100	Mooring Buoy Program						
100	B.1 Boat Access		Refer to Channel Marking Action Plan				
100	B.15 Mooring Buoy Management	High	Medium	36+	<50%	10	13

the Channel/Reef Marking Action Plan. The Mooring Buoy Management (B 15) strategy is included in priority level 2 (Table 14). This strategy will have some level of implementation within year 1.

Implementing all mooring buoy strategies is expected to cost \$1.2 million over five years. Funding will come from a mix of public (Federal, State, and local) and private agencies and institutions. Only about 20 percent of the funding needed for full implementation is currently available. Twenty-four institutions are identified as potential participants in this program.

**Relationship to Other Action Plans** The Boat Access strategy is described in detail in the Channel/Reef Marking Action Plan. Both the Boat Access and Mooring Buoy Management strategies are also included in the Regulatory and Volunteer action plans.

## Goals and Objectives

**National Goals** The goals of the Mooring Buoy Program represent, and are consistent with, the goals of the National Marine Sanctuary Program regarding the protection of Sanctuary resources, specifically coral reef formations and other sensitive marine habitats. By allowing and/or directing access at selected locations, a Mooring Buoy Program can also limit resource-use conflicts and damage to the Sanctuary environment.

**Sanctuary Goals** The Mooring Buoy Action Plan will further the Sanctuary's goal of protecting and managing the Keys' natural and cultural resources by

- minimizing impacts to sensitive marine habitats, specifically coral reef formations, caused by the inappropriate use of anchors,
- providing reasonable access to Sanctuary resources, consistent with the primary goal of resource protection, and
- managing and/or restricting human activities where such activities are found to have a detrimental impact on Sanctuary resources.

**Mooring Buoy Program Objectives** To accomplish these goals, the following objectives have been set

- the characteristics of boater and diver use in coral reef areas throughout the Sanctuary will be assessed,

## Existing Programs

Mooring buoys have been used as a management tool in the Keys for many years, primarily within the Key Largo and Looe Key national marine sanctuaries. The mooring buoys located in the sanctuaries are maintained through NOAA funds contracted to private individuals or organizations. Mooring buoys have also been used in John Pennekamp Coral Reef State Park, but have been removed due to increased damage that occurred to the patch reefs. In addition, several non-profit and volunteer-based groups have installed and maintained mooring buoys in the Keys. The primary volunteer organizations involved in mooring buoy placement are Reef Relief, which has installed more than 125 buoys around Key West; and the Coral Reef Foundation, which has installed 24 buoys in the Islamorada/Tavernier area. Volunteer donations of time and money are the primary methods of buoy maintenance.

In addition to these groups, several private organizations have installed mooring buoys at specific locations associated with their interests or business. For example, the buoys at Cheeca Rocks off Islamorada were installed by the Cheeca Lodge Resort.

A cooperative boat-use survey has been conducted by The Nature Conservancy and the Florida Department of Environmental Protection. It provides aerial and on-water assessments of spatial and temporal boater use within the Sanctuary. A series of overflights from Fowey Rocks (Biscayne National Park) to the Marquesas was conducted to provide instantaneous boat counts throughout Sanctuary waters. A stratified random sampling procedure was used to collect representative data for weekends, weekdays, seasons, and special events (holidays, lobster season, etc.). The aerial surveys classify boat use into several size and activity categories, and have a resolution of approximately one square mile. The on-water surveys were conducted to provide hourly boat counts at selected locations to calibrate the aerial counts, and determine peak usage and turnover patterns. These surface surveys also tallied boating activities and the number of divers and/or snorkelers, information that can then be used to determine use levels at various locations.

- a database of boater and diver use and existing mooring buoy locations will be prepared,
- the criteria necessary for determining the location of additional mooring buoys to meet the existing demand will be developed,
- the impact of boater and diver use in coral reef areas will be assessed,

- a standardized marking system for mooring buoys within the Sanctuary will be developed;
- the impact of large vessels on mooring buoy systems and the optimum vessel size for a variety of buoys will be determined; and
- vessel size restrictions associated with mooring buoy use will be considered.

## Description of Strategies

### Mooring Buoy Program

The Mooring Buoy Action Plan contains two strategies developed during the Management Plan process and included in Alternative III. The first will assess boat access throughout the Sanctuary; and the second will use this information (through a cooperative forum of involved agencies and interest groups) to develop a comprehensive mooring buoy siting and management plan.

#### Mooring Buoy Strategies

**B.1: Boat Access** (This strategy is described in detail in the Channel Marking Action Plan)

**B.15: Mooring Buoy Management**

- Maintain existing mooring buoys
- Assess current mooring buoy technology
- Review visitor use and boating data
- Develop siting criteria
- Recommend new sites for mooring buoy installation
- Conduct site assessments of proposed locations
- Determine costs of implementation and maintenance
- Install additional mooring buoys
- Implement vessel size limits in high-use areas
- Evaluate effectiveness and influences of mooring buoy placement

### Strategy B.1: Boat Access

Conduct a survey to assess public and private boat access throughout the Sanctuary to develop a low-impact access plan; direct new public access to low-impact areas; and modify as appropriate any access affecting sensitive areas throughout the Sanctuary.

***This strategy is described in detail in the Channel Marking Action Plan. It is also included in the Volunteer Action Plan.***

### Strategy B.15: Mooring Buoy Management

Develop a comprehensive mooring buoy plan providing for the maintenance of buoys, the placement of buoys as needed, and the implementation of vessel size limits at mooring buoys throughout the Sanctuary. Conduct an assessment of current mooring buoys and mooring buoy technology to determine the influence that the presence of mooring buoys has on Sanctuary resources; and to evaluate which are the most environmentally sound, cost-effective, and functional for use in Sanctuary waters.

*(Priority Level High, Medium Level of Action in Year 1, 36+ Months to Complete, <50% Funding for Full Implementation)*

**Activity 1-Maintain Existing Mooring Buoys.** While the Comprehensive Mooring Buoy Plan is being developed, the existing system of mooring buoys must be maintained. In some cases, volunteers may help to maintain the mooring buoys.

■**Existing Program Implementation.** There are currently over 340 mooring buoys within the Sanctuary that are maintained through a combination of government agencies and private organizations.

■**Implementation.** NOAA, in cooperation with existing agencies and NGOs that maintain mooring buoys, will be the lead agency responsible for implementing this activity. At a minimum, this will include maintaining the mooring buoys within the Key Largo and Looe Key national marine sanctuaries, and adjacent areas where the sanctuary is currently maintaining buoys. NOAA will also assist, both financially and through logistical support, other organizations that install and maintain mooring buoys. Volunteers will be utilized to assist in some aspects of the maintenance of mooring buoys to the maximum extent feasible.

■**Schedule.** This activity will have a high level of action in year 1. It will be an ongoing activity and obligation.

**Activity 2-Assess Current Mooring Buoy Technology.** The various types of mooring buoy designs available for use in the Sanctuary will be reviewed, and the substrate type most appropriate for each will be determined. Methods of limiting resource damage through mooring buoy installation will be assessed, as will vessel impacts on mooring buoys.

■**Existing Program Implementation.** Many components of this activity have already been completed through an ongoing analysis of mooring buoy systems in use at the Key Largo and Looe Key national marine sanctuaries and research on visitor use impacts to patch reefs at JPCRSP. The publication "The Use of Mooring Buoys as a Management Tool" (van Breda and Gjerde, 1992) also contains an excellent review of mooring buoy types and uses. Vessel impacts on mooring buoys remain to be addressed.

■**Implementation.** NOAA will be the lead agency responsible for implementing the assessment of vessel impacts. NOAA will work with the Sanctuary Advisory Council, other sanctuaries, such as Flower Garden Banks, and applicable nongovernmental organizations (NGOs), such as Reef Relief, that have experience with mooring buoy systems used by larger vessels.

■**Schedule.** This activity will have high level of action in year 1. It will require 6 months to complete.

**Activity 3-Review Visitor-Use and Boating Data.** All boating activity and visitor-use data collected by various surveys will be compiled in a format that relates to mooring buoy planning. This will include targeting data on diving activity around major coral reef systems, and considering the impact of special events, such as holidays and lobster season, on boating patterns. On-water surveys will be correlated with aerial data to determine peak usage and turnover rates in high-use areas. To enable recommendations for mooring buoy additions or deletions, visitation data will be compared with existing mooring buoy locations.

■**Existing Program Implementation.** The FDEP, through Looe Key National Marine Sanctuary, contracted TNC to compile visitor-use and boating data related to mooring buoy planning. A report entitled "An Evaluation of Mooring Buoys in the Florida Keys National Marine Sanctuary Based on Boating Patterns" has been completed addressing some of the items identified in this activity.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The recommendations of the visitor use and boating survey will be considered, along with additional data, analyses and input from all available sources. NOAA will work with the Sanctuary Advisory Council and the working group established in Activity 4 to review the information gathered in this activity.

■**Schedule.** This activity will have a high level of action in year 1. It will require 6 months to complete.

**Activity 4-Develop Siting Criteria.** Based on all available information, criteria will be developed for future mooring buoy siting within the Sanctuary. A workshop will be conducted with representatives of the Sanctuary Advisory Council, affected agencies, NGOs and other interested parties to identify criteria for allocating existing buoys and siting new buoys. A working group will be established to advise and facilitate the development of the mooring buoy management plan.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity by organizing the working group and facilitating the workshop.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 12 months to complete.

**Activity 5-Recommend New Sites for Mooring Buoy Installation.** After mooring buoy siting criteria have been established, areas where new mooring buoys should be installed will be identified based on the visitor-use data, resource management concerns, level of demand and other relevant information. Priority areas for installation will be developed based on established criteria.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. Recommendations will be made by the working group established in Activity 4.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 12 months to complete.

**Activity 6-Conduct Site Assessments of Proposed Locations.** Areas identified for the installation of new mooring buoys will be surveyed to determine: 1) the health of the habitat in relation to visitor use; 2) types of use and use patterns (e.g., size of vessels, glass-bottom boat use, unusual features, etc.); and 3) the number, location, and concentration of specific mooring buoys on the reef. The areas will be mapped using aerial photographs, and proposed mooring buoy locations will be identified.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. Biologists from the FDEP and members of the Sanctuary Advisory Council will be consulted for the resource survey.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 18 months to complete.

**Activity 7-Determine Costs of Implementation and Maintenance.** After establishing the number of mooring buoys suitable for each primary area, installation and maintenance costs will be determined. Maintenance costs will be based on past costs at the Key Largo and Looe Key National Marine Sanctuaries and relevant NGOs (e.g., Reef Relief, etc.). The ability to fund adequate maintenance activities will be a primary factor in determining the priority areas where new mooring buoys will be installed.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. Other agencies and NGOs with mooring buoy experience (e.g., the FDEP, Reef Relief, etc.) will be consulted to determine installation and maintenance costs.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 18 months to complete.

**Activity 8-Install Additional Mooring Buoys.** Based on the recommendations developed in Activity 5, 6 and 7, new mooring buoys will be installed at the locations identified. In some cases, volunteers may help to install the mooring buoys.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. Assistance will be solicited from other agencies, volunteers and NGOs.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 24 months to complete.

**Activity 9-Implement Vessel Size Limits in High-Use and Sensitive Areas.** Based on vessel-impact information, size limits will be established for the various classifications of mooring buoys. Size limits will be based on considerations concerning the force necessary to make the anchoring system fail under established design parameters. To allow larger vessel buoy use in selected areas, several categories of mooring buoy sizes (such as the "big boat" buoys that have been installed by Reef Relief near Key West) will be considered. Aesthetic and recreational crowding factors will be considered as well. *The size limits shall be incorporated into the Federal Regulations established for the Sanctuary after the supporting data has been gathered.*

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. Other agencies, the Sanctuary Advisory Council, and NGOs with mooring buoy experience (e.g., Reef Relief, etc.) will be consulted.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 24+ months to complete.

**Activity 10-Evaluate effectiveness and influences of mooring buoy placement and make changes as necessary.** This activity will establish a monitoring program to assess the effectiveness and influences of mooring buoys on coral reefs and other sensitive habitats. Baseline surveys and monitoring programs will be conducted in areas with existing mooring buoys, prior to and after the installation of new mooring buoys, and in areas without mooring buoys that have little or no diving or boating activity. This activity will be coordinated with the monitoring programs established for the Sanctuary Preservation Areas and Research-Only Special-Use Areas in the Research and Monitoring Action Plan. In areas that are found to be detrimentally impacted by the presence of mooring buoys, those buoys will be removed.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. FDEP will provide support in implementing this activity.

■ **Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

## Implementation

*This section explains how the strategies in the Mooring Buoy Action Plan will be implemented. The institutions responsible for each activity, and those agencies that will provide some level of assistance, are identified. In addition, the planned level of activity in year 1, months required to complete, funding availability, cost estimates, staff requirements, and geographic focus for each strategy/activity are provided. Finally, the process used to evaluate the effectiveness of the Mooring Buoy Program as it evolves over time is described.*

The primary strategy associated with this plan (B.15, development of a comprehensive mooring buoy plan) is considered a high-priority strategy, due to the success of mooring buoy programs in the Key Largo and Looe Key National Marine Sanctuaries, and other locations in the Florida Keys. Funding will be a major consideration, because developing a mooring buoy system similar to that currently in place in existing sanctuaries would be considerably expensive. Creative ways of funding the mooring buoy system must be explored to maintain it in the long term.

**Responsible Institutions.** NOAA will be the lead agency responsible for implementing the activities

Table 15. Agencies/Organizations Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies/Organizations								
	NOAA-Sanctuary	USFWS	USCG	ACOE	NPS	FDEP	FDCA	Monroe County	CMC
<b>MOORING BUOY PROGRAM</b>									
<b>B.1 Boat Access</b>	Refer to Channel Marking Action Plan								
<b>B.15 Mooring Buoy Management</b>									
Maintain the Existing Mooring Buoy System	●								
Assess Current Mooring Buoy Technology	●					●	○	●	○
Review Visitor-Use and Boating Data	●	○	○	○	○	○	○	○	○
Develop Siting Criteria	●	○	○	○	○	○	○	○	○
Recommend New Sites for Mooring Buoy Installation	●	○	○	○	○	○	○	○	○
Conduct Site Assessments of Proposed Locations	●		○		●			○	
Determine Costs of Implementation and Maintenance	●				●				
Install Additional Mooring Buoys	●							○	
Implement Vessel Size Limits in High-use Areas	●	○			○		○		
Evaluate Effectiveness and Influences of Mooring Buoy Placement and Make Changes as Necessary	●				○				

● Lead ○ Primary Role ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; USFWS, U.S. Fish and Wildlife Service; USCG, U.S. Coast Guard; ACOE, U.S. Army Corps of Engineers; NPS, National Park Service; FDEP, Florida Department of Environmental Protection; FDCA, Florida Department of Community Affairs; TNC, The Nature Conservancy; RR, Reef Relief; CMC, Center for Marine Conservation.

Table 16. Requirements for Implementation

Strategy/Activity	Overall Sanctuary Priority Level	Implementation			Cost to Complete		Geographic Focus	# of Personnel	
		Planned Level of Action in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations /Maint. (\$1,000)			
MOORING BUOY PROGRAM									
B.1 Boat Access		Refer to Channel Marking Action Plan							
B.15 Mooring Buoy Impacts	Medium	Low	36+	<50%	100-999	1,000-5,000		20	
Maintain the Existing Mooring Buoy System	High	High	36+	<50%	100-999	1,000-5,000	SW		
Assess Current Mooring Buoy Technology	High	High	6	75-99%	NC	<10	SW		
Review Visitor-Use and Boating Data	High	High	6	75-99%	NC	<10	SW		
Develop Siting Criteria	High	Medium	12	75-99%	NC	<10	SW		
Recommend New Sites for Mooring Buoy Installation	High	Medium	12	75-99%	NC	<10	SW		
Conduct Site Assessments of Proposed Locations	High	Low	18	<50%	NC	10-99	SW		
Determine Costs of Implementation and Maintenance	High	Low	18	75-99%	NC	<10	SW		
Install Additional Mooring Buoys	High	Low	24	<50%	10-99	10-99	SW		
Implement Vessel Size Limits in High-use Areas	Medium	Low	24+	100%	NC	NC	SW		
Evaluate Effectiveness and Influences of Mooring Buoy Placement	Medium	Low	36+	<50%	10-99	10-99	SW		

Abbreviations: Maint., Maintenance; SW, Sanctuary Wide.

Note: The priority levels for activities should not be compared across strategies—they only represent the relative importance of activities contained within a strategy.

within this action plan. However, the success of the Mooring Buoy Program will depend on the cooperation of other Federal, State, and local government agencies, primarily the FDEP (Division of Marine Resources, Florida Marine Research Institute, and Florida Marine Patrol), U.S. Army Corps of Engineers, U.S. Coast Guard, and Monroe County. NGOs including TNC, Reef Relief, the Coral Reef Foundation, and the Center for Marine Conservation will also play an important role implementing activities in the plan. Reef Relief will play a primary role due to its history of mooring buoy installation and maintenance in the Key West area. Table 15 lists the responsible institutions and their level of responsibility in each activity.

**Prioritization of Implementation.** The Boat Access strategy (B.1) is essentially complete and, therefore, has not been assigned a priority level. Strategy B.15 is included in medium priority level (Table 16). Consequently, it is expected to be implemented in year 1. The implementation of a mooring buoy system has been shown to be an effective manage-

ment tool for protected marine areas worldwide, especially in coral reef ecosystems. It is a simple, relatively noncontroversial, and extremely visible action that will protect delicate reef structures. Accordingly, the Mooring Buoy strategy is ranked among the three highest groups for management action.

**Schedule.** Table 16 lists the estimated time required for implementing each strategy and activity in the program. The number of months required to complete each strategy and activity is also provided.

**Cost.** The costs associated with implementing the Mooring Buoy Program are expected to be significant (up to \$250,000 in initial capital costs and an additional \$200,000 for annual operation and maintenance costs). Annual maintenance of the mooring buoy system will be a significant ongoing obligation. Funding will depend on allocation from NOAA's operations budget. In addition, funding mechanisms already established by NGOs must be maintained and new funding sources (e.g., "Adopt-a-Buoy," etc.) explored.



**Geographic Focus.** Each strategy will be implemented Sanctuary-wide.

**Staff.** A staff of four full-time personnel will be needed to maintain the mooring buoy system adequately Sanctuary-wide. All staff must be experienced boat captains with local knowledge of Sanctuary waters. Alternatively, contracts could be developed with private contractors on a regional basis to ensure buoy maintenance. If the latter approach is taken, the Sanctuary staff will only need to include one contract/grant specialist, and the mooring buoy-related activities will require approximately 25 percent of his/her time.

**Equipment.** If the mooring buoys are maintained by Sanctuary staff, two vessels will be required. Each vessel should be at least 25 to 30 feet in length and should be fully equipped with standard navigational equipment. At least one of the vessels should have a built-in hydraulic winch system for servicing larger boundary buoys. The Sanctuary currently owns two complete sets of hydraulic installation equipment. One additional backup system may be required in the future.

**Contingency Planning for a Changing Budget.** To the extent possible, the Sanctuary will encourage the mooring buoy maintenance programs of existing and future private and nonprofit organizations. The Sanctuary will also consider alternative funding sources for the mooring buoy system, including an "Adopt-a-Buoy" program, utilizing volunteers, or other innovative funding mechanisms. If an adequate budget is not available and alternative funding sources are not feasible, mooring buoy maintenance costs can be reduced by cutting the number of mooring buoys in the system. However, the use of mooring buoys is one of the most basic and cost effective mechanisms for reducing physical impacts in sensitive areas, and reducing the number of buoys will only be considered after all other cost saving actions have been explored. Reductions in buoy placement levels will be based on existing and ongoing boater and visitor-use data, ensuring that the most heavily used areas continue to be maintained.

**Evaluating Program Effectiveness and Efficiency.** Information on boater and visitor-use patterns is extremely important in determining whether the mooring buoy system is being utilized efficiently. Areas where mooring buoys are not being used should be removed from the system. A study should be conducted to determine whether buoy maintenance is most cost-efficient through an in-house

program or through an external contract. A research program should be carried out to determine whether the system is reducing damage to coral reefs and other marine habitats by limiting anchor damage. The research must address concerns that the buoys attract more boaters and divers to an area, thereby contributing to long-term cumulative damage resulting from overuse.

# Regulatory Action Plan

***This action plan sets forth the regulations for the Florida Keys National Marine Sanctuary (FKNMS or Sanctuary), and explains how management strategies have been incorporated into them. Regulations are an integral component of the FKNMS management process. They make up an important part of the management plan by regulating certain activities on a Sanctuary-wide basis and by regulating other activities depending on how that area of the Sanctuary has been categorized or zoned. Permitting, certification, and notification and review processes are established to allow certain activities otherwise prohibited to take place under carefully controlled circumstances. The regulations comply with the goals and objectives of the Florida Keys National Marine Sanctuary and Protection Act (FKNMSPA) and the National Marine Sanctuaries Act (NMSA).***

In addition to the issuance of these regulations, NOAA intends to coordinate with other Federal/State and local agencies in their enforcement of existing regulations under Federal, State, and local laws that already regulate some portion of the actions called for in specific management strategies. Because coordination with existing authorities is an important component of comprehensive ecosystem management, the Sanctuary regulations supplement, not replace, existing authorities.

The final regulations address 19 of the management strategies that have a regulatory component. The other strategies that have a regulatory component are either management actions that are already covered by existing Federal, State, or local regulations or strategies that need further analysis before they can be implemented.

***About this Plan.*** The format of this action plan is unlike the others in this document. The action plan outlines how management strategies have been incorporated into the regulations, and summarizes the process for developing future regulations. The action plan's main component is the attached FKNMS regulations.

## Goals and Objectives

This action plan establishes a comprehensive and coordinated regulatory program for the FKNMS to ensure the protection and use of Sanctuary resources in a manner that:

- complements existing regulatory authorities;
- facilitates all public and private uses of the Sanctuary that are consistent with the primary objective of resource protection;
- utilizes a system of temporal and geographic zoning to ensure effective site-specific resource protection and use management;
- ensures coordination and cooperation between Sanctuary management and other Federal, State, and local authorities with jurisdiction within or adjacent to the Sanctuary;
- achieves simplicity in the regulatory process and promotes ease of compliance with Sanctuary regulations;
- promotes mechanisms for making informed regulatory decisions based on the best available research and analysis, taking into account information about the environmental, economic, and social impacts of Sanctuary regulations; and
- complements coordination among appropriate Federal, State, and local authorities to enforce existing laws that fulfill Sanctuary goals.

## Existing Legislative Authorities

There are a number of existing Federal and State conservation laws that either partially or entirely address some regulatory components of the various management strategies. NOAA's final regulations supplement existing laws and regulations and avoid unnecessary duplication. In a few instances agencies involved in the planning process specifically requested that the Sanctuary regulations incorporate existing laws and regulations to improve and enhance enforcement, through such things as the use of civil penalties under the Sanctuary acts. Clearly, effective enforcement of relevant existing Federal, State, and local regulations will be important for maintaining the health of the Sanctuary (see Enforcement Action Plan).

Relevant Federal laws include the Coastal Zone Management Act; Magnuson Fishery Conservation and Management Act; Clean Water Act, Rivers and

Harbors Act; and Coastal Barrier Resources Act. At the State level, laws that address the regulatory requirements specified in the strategies include the Beach and Shore Preservation Act; Florida Environmental Land and Water Management Act; Florida Air and Water Pollution Control Act, and the Florida Clean Vessel Act. These laws and others are summarized in Appendix C of Volume III.

At the local level, the regulatory requirements complement the goals, objectives, and policies established by Monroe County in its Year 2010 Comprehensive Plan.

### NOAA Regulatory Actions

The primary purpose of regulating activities affecting Sanctuary resources or qualities is to protect, preserve, and manage the area's conservation, ecological, recreational, research, educational, historical, and aesthetic resources and qualities. Another purpose is to minimize conflicts among users of these resources. The regulations are based primarily on the requirements of the FKNMSPA and NMSA, as specified in 20 management strategies developed in accordance with the comprehensive planning process for the Sanctuary.

#### Boating

**B.4: Marking Channels/Reefs.** This strategy requires: 1) the placement of buoys; 2) marking frequently used and preferred channels; and 3) reducing boat wakes in sensitive habitats, areas vulnerable to erosion, and high-density areas such as marinas.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.163(a)(5) which prohibits operating a vessel at a speed greater than idle speed only/no-wake within certain areas including: areas designated idle speed only/no wake; and 100 yards of navigational aids indicating emergent or shallow reefs.

**B.5: Boat Groundings.** Developing a response plan for boat groundings throughout the Sanctuary. Under this strategy, a standard response plan will be developed to address boat groundings throughout the Sanctuary.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.163(a)(5) which prohibits prop scarring or other injury to seagrasses or the seabed.

**B.7: Pollution Discharges.** This strategy will help avoid further water quality degradation in the Sanctuary caused by boaters and live-aboards by: 1) requiring them to use holding tanks; and 2) prohibiting the discharge of substances (other than finfish waste and exhaust) into nearshore waters.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.163(a)(4) which prohibits discharging or depositing materials or other matter in the Sanctuary. Exceptions to this prohibition are discharging or depositing fish, fish parts, and bait during traditional fishing operations; from vessel operations (cooling waters, engine exhaust, and deck wash) and marine sanitation devices. However, in protective zones (i.e., Wildlife Management Areas, Ecological Reserves, Sanctuary Preservation Areas, and Special-use Areas), the only discharges allowed are from engine exhaust and cooling water.

**B.11: Special-use Permits.** This strategy allows the issuance of Special-use permits to conduct concession-type or commercial activities within the Sanctuary under certain conditions. Activities conducted under Special-use Permits will be monitored and permit conditions enforced.

**Sanctuary Regulations.** Section 922.166(d) provides for the issuance of national marine sanctuary Special-use Permits.

**B.13: Salvaging/Towing.** This strategy will reduce damage to natural resources resulting from improper vessel salvage methods by developing standard vessel salvage procedures, including: 1) obtaining a permit; 2) notifying authorities; 3) where appropriate, having an authorized observer at the site or receiving permission to proceed; 4) providing operator training; and 5) promoting the use of environmentally sound salvaging and towing practices and techniques. Permitting for salvaging and towing operations will be implemented throughout the Sanctuary.

**Sanctuary Regulations.** NOAA is not at this time issuing regulations to implement this strategy; however, it is working with the salvage and tow industry to achieve this goal. However, to the extent that a salvage operation involves conducting prohibited activities, section 929.166 provides for the issuance of national marine sanctuary general permits or Special-use permits to allow the activity.

**B.17: Vessel Operations/PWC Management.** This strategy addresses impacts to Sanctuary resources and conflicts among users of the Sanctuary resulting from vessel operation, including personal watercraft.

Vessel Operation. This strategy imposes a number of different restrictions, at section 922.163(a)(5), on all vessels, including personal watercraft. Restrictions include the following:

- 1) a prohibition on operating vessels in a manner which injures coral, seagrasses, and hardbottom habitats throughout the Sanctuary;
- 2) a prohibition on anchoring vessels on coral in depths less than 40 feet of water when the operator can see the seabed;
- 3) a prohibition on operating vessels carelessly or recklessly;
- 4) a prohibition on all vessels from operating at speeds greater than idle speed only/no wake (except in marked channels) in areas designated as idle speed only/no wake, within 100 yards of residential shorelines and stationary vessels, within 100 feet of the red and white "divers down" flag or the blue and white "alpha" flag (in Federal waters), and within 100 yards of navigational aids indicating shallow or emergent reefs; and
- 5) a prohibition on all vessels from operating in such a manner as to injure, harass, or cause disturbance to wading, roosting, or nesting birds or marine mammals.

PWC Management. The issue of operation of personal watercraft within the Sanctuary received the largest volume of public comment during the 9 month review of the draft management plan. It continued throughout the comment period to be the most heavily debated issue by the Sanctuary Advisory Council aside from the draft zoning plan. For these reasons, NOAA has paid particular attention to this issue and is making a commitment to resolving the issue, beginning with the final regulations. Although the interest of all concerned parties may not be met to their full satisfaction, the final plan takes a proactive approach to dealing with this issue based on recommendations from the Sanctuary Advisory Council.

In addition to the above regulations on vessel operation, the final regulations prohibit the operation of PWCs in portions of the Wildlife Refuges in the

Lower Keys. During the year following issuance of the regulations, NOAA will work with the Sanctuary Advisory Council and the personal watercraft industry to resolve some of the issues that remain, such as limiting commercial rental operations to within line of sight, requiring a rescue/chase vessel be available, making training available for employees of rental operations, etc.

## Fishing

*F.1: Consistent Fishing Regulations.* This strategy should ensure administrative and regulatory coordination between fisheries regulatory agencies operating within Sanctuary waters through a protocol for drafting and revising fisheries regulations in order to implement a consistent set of fishing regulations throughout the Sanctuary. This strategy is encompassed in the Protocol for Cooperative Fisheries Management, Volume III, Appendix J.

*F.4: Aquaculture Alternatives.* This strategy should reduce fishing pressures on wild marine life species and help satisfy the commercial demand for these species. This is a long-term effort designed to identify and develop mariculture techniques and promote the development of mariculture operations.

Sanctuary Regulation(s). These requirements are addressed by section 922.166(d) which provides for the issuance of Special-use permits and section 922.168 which governs notification and review of applications for leases, licenses, permits approvals, or other authorizations to conduct a prohibited activity.

*F.7: Artificial Reefs.* Regulations will be developed for the construction of artificial reefs in the Sanctuary.

Sanctuary Regulations. These requirements are partially addressed by sections 922.163(a)(3) and (4) which prohibit alteration of the seabed and discharge/deposit of materials without a permit, respectively, section 922.166 which provides for the issuance of national marine sanctuary general permits, section 922.167 which governs certification of preexisting leases, licenses, permits, approvals, other authorizations, or rights to conduct a prohibited activity, and section 922.168 which governs notification and review of applications for leases, licenses, permits approvals, or other authorizations to conduct a prohibited activity.

*F.8: Exotic Species.* Implement regulations to prevent the release of exotic species into the Sanctuary.

Sanctuary Regulations. These requirements are addressed by section 922.163(a)(7) which prohibits the release or introduction of exotic species of plants, invertebrates, fish, amphibians, or reptiles into waters of the Sanctuary.

*F.11: Gear/Method Impacts.* Regulations will be developed requiring the use of low-impact gear and methods in priority areas. Regulatory implementation will be in accordance with strategy F.1.

Sanctuary Regulations. These requirements are partially addressed by section 922.163(a)(11) which prohibits the use of explosives, poisons, oil, and bleach as fishing methods and the Protocol for Cooperative Fisheries Management.

*F.14: Spearfishing.* Regulations restricting spearfishing will be developed for high-priority areas (i.e., those areas exhibiting a low stock abundance, a high degree of habitat damage, or a high degree of user conflicts). Restriction may include gear prohibitions, or the closure of selected areas (e.g., around residential areas). This strategy will also support any existing spearfishing closures in Sanctuary waters.

Sanctuary Regulations. These requirements are partially addressed by section 922.164 which prohibits spearfishing in Ecological Reserves, Sanctuary Preservation Areas, the Key Largo and Looe Key existing management areas, and the four research-only Special-use Areas and by the Protocol for Cooperative Fisheries Management.

### Submerged Land Use

*L.14: Dredging Prohibition.* This strategy will eliminate the possibility of new dredge and fill activities within the Sanctuary. However, dredge and fill activities may be allowed if they are in the public's interest (as determined by the USACE) and if little or no environmental degradation is likely to occur. No dumping of dredge material will be permitted in the Sanctuary except as a restoration or renourishment project strictly conditioned to allow little or no environmental degradation.

Sanctuary Regulations. These requirements are partially addressed by section 922.163(a)(3) which, with certain exceptions, prohibits alteration of the seabed (with exceptions), section 922.163(a)(4) which prohibits discharging or depositing materials or other matter (with exceptions), section 922.166 which sets forth a permitting mechanism for allowing otherwise prohibited activities in the Sanctuary;

section 922.167 which sets forth a requirement and procedures for the certification of preexisting leases, licenses, permits, approvals, other authorizations, or rights to conduct a prohibited activity; and section 922.168 which requires the notification of and review of applications for leases, licenses, permits, approvals, or other authorizations to conduct a prohibited activity.

*L.15: Dredging Regulation.* This strategy calls for the development of new policies and regulations requiring the use of low-impact technologies for maintenance dredging and prohibiting such dredging in areas where significant reestablishment of sensitive benthic communities has occurred (i.e., seagrass and coral habitats).

Sanctuary Regulations. These requirements are partially addressed by section 922.163(a)(3) which prohibits, with certain exceptions, alteration of the seabed, section 922.163(a)(4) which prohibits, with certain exceptions, discharging or depositing materials or other matter, section 922.166 which sets forth a permitting mechanism for allowing otherwise prohibited activities in the Sanctuary; section 922.167 which sets forth a requirement and procedures for the certification of preexisting leases, licenses, permits, approvals, other authorizations, or rights to conduct a prohibited activity; and section 922.168 which requires the notification of and review of applications for leases, licenses, permits, approvals, or other authorizations to conduct a prohibited activity.

### Submerged Cultural Resources

*R.1 SCR Management.* This strategy calls for the development of a set of management practices, guidelines, and regulations addressing the exploration, removal, research, and dispensation of artifacts consistent with Federal and State archaeological policies, programs, and regulations. It also requires the development and implementation of a permitting system for these artifacts, to be applied throughout the Sanctuary, with a provision for exemptions for nondestructive exploration.

Sanctuary Regulations. These requirements are partially addressed by section 922.163(a)(3) which prohibits the alteration of, or construction on, the seabed; section 922.163(a)(9) which prohibits moving, removing, injuring, or possessing a Sanctuary historic resource (or attempting to do any of these activities), except pursuant to a valid Sanctuary permit; and section 922.166 which provides, in

pertinent part, for the issuance of national marine sanctuary permits for the survey/inventory and research/recovery of historical resources and national marine sanctuary Special-use Permits for the deaccession/transfer of such resources.

## Recreation

**R.7 Coral Touching.** This strategy will protect coral communities from damage by prohibiting coral touching in high-use, sensitive, and vulnerable areas.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.163(a)(2) which prohibits the removal, damage, distribution, or injury of any living or dead coral or coral formation and section 922.164 which prohibits the touching of coral in Sanctuary Preservation Areas and Ecological Reserves.

## Zoning

**Z.1 Wildlife Management Areas.** Under this strategy, regulations have been developed to protect wildlife populations and habitat, while providing opportunities for public use. Regulations include various access restrictions including no-access buffer zones, no-motor zones, and idle speed only/no-wake zones. Some of the regulations have seasonal components (e.g., nesting season closures). Sanctuary permits allow for access and activities otherwise prohibited. This zoning type includes measures contained in management plans for the Great White Heron, Key West, and National Key Deer Wildlife Refuges developed by the USFWS and the FDEP.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.164 which contains, in pertinent part, certain provisions applicable to Wildlife Management Areas and section 922.162 which defines this zone type.

**Z.2 Ecological Reserves.** Ecological Reserves are designed to protect and preserve natural assemblages of habitats and species consistent with the resource protection and multiple-use objectives of the Sanctuary.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.164 which contains, in pertinent part, certain provisions applicable to Ecological Reserves and section 922.162 which defines this zone type.

**Z.3 Sanctuary Preservation Areas.** These zones focus on the protection of shallow, heavily used reefs where conflicts occur between user groups and where concentrated visitor activity leads to resource degradation. They are designed to enhance the reproductive capabilities of renewable resources, protect areas that are critical for sustaining and protecting important marine species, and reduce user conflicts in high-use areas. This is accomplished through a prohibition of consumptive activities within these areas.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.164 which contains, in pertinent part, certain provisions applicable to Sanctuary Preservation Areas and section 922.162 which defines this zone type.

**Z.4 Existing Management Areas.** This strategy identifies existing resource management areas established by NOAA or by another Federal, State, or local authority within the Sanctuary. This strategy may necessitate additional regulations in areas currently managed by agencies other than the Sanctuary. Additional regulations would recognize established management areas and complement existing management programs.

**Sanctuary Regulations.** These requirements are partially addressed by section 922.164 which contains, in pertinent part, certain provisions applicable to Existing Management Areas and section 922.162 which defines this zone type.

**Z.5 Special-use Areas.** This strategy is designed to delineate areas of special concern where specific issues can be addressed through the use of zoning. Through the zone type, areas can be set aside for specific uses to reduce conflicts and minimize adverse environmental effects from high-impact activities. This will be accomplished by designating selected areas where activities can be conducted with minimal disturbance to other users and the environment. Special-use Areas may include areas set aside for research and monitoring, restoration sites, archaeological sites, etc. They will also delineate areas where activities, such as personal watercraft use and live-aboard mooring fields are established in specific areas to reduce adverse environmental impacts. This is the broadest zoning classification, and encompasses the greatest range of management issues. The boundaries of these areas will be established to address management issues and needs, and may include seasonal or emergency closures.

Sanctuary Regulations. These requirements are partially addressed by section 922.164 which contains, in pertinent part, certain provisions applicable to Special-use Areas, section 922.166, which in pertinent part, provides for the issuance of Special-use Permits, and section 922.162 which defines this zone type.

### Next Steps

There are management strategies with a regulatory component that may be addressed in the future. They were not addressed in the final regulations because they either require additional information gathering, are addressed through existing regulatory authorities, or were not identified as strategies requiring the immediate commitment of available management and enforcement resources. In addition, there are components of strategies that were addressed, while other components will or may be addressed in the continuing management process.

Existing authorities will be utilized to the maximum extent possible to establish comprehensive management. Existing legislation, either in its current form or slightly modified, may be adequate to accomplish the regulatory objectives of selected strategies.

## Florida Keys National Marine Sanctuary Regulations

15 CFR PART 922—Provisions applicable to the Florida Keys National Marine Sanctuary (FKNMS)

[Sections 922.3, 922.42, 922.45, 922.46 and 922.50 are found in Subparts A and E of 15 CFR Part 922 and except for minor technical revisions are as they presently exist (provisions of these sections not applicable to the FKNMS have been omitted); sections 922.160, 922.161, 922.162, 922.163, 922.164, 922.165, 922.166, 922.167, and 922.168 are new sections applicable only to the FKNMS and will appear in a new Subpart P to 15 CFR 922. When this notice is published in the Federal Register it will be revised to include amendatory language to the Code of Federal Regulations and to eliminate sections reprinted here that presently appear in the Code of Federal Regulations.]

Sec.	Purpose.
§ 922.160	
§ 922.161	Boundary.
§ 922.3	Definitions applicable to all National Marine Sanctuaries.
§ 922.162	Definitions applicable to the Florida Keys National Marine Sanctuary only.
§ 922.42	Allowed activities.
§ 922.163	Prohibited activities - Sanctuary-wide.
§ 922.164	Additional activity regulations by Sanctuary area.
§ 922.165	Emergency regulations.
§ 922.45	Penalties.
§ 922.46	Response costs and damages.
§ 922.166	Sanctuary permits - application procedures and issuance criteria.

§ 922.167 Certification of preexisting leases, licenses, permits, approvals, other authorizations, or rights to conduct a prohibited activity.

§ 922.168 Notification and review of applications for leases, licenses, permits, approvals, or other authorizations to conduct a prohibited activity.

§ 922.50 Appeals of administrative action.

Appendix I to Part 922, Subpart P—Florida Keys National Marine Sanctuary boundary coordinates

Appendix II to Part 922, Subpart P—Existing Management Areas boundary coordinates

Appendix III to Part 922, Subpart P—Wildlife Management Areas access restrictions

Appendix IV to Part 922, Subpart P—Ecological Reserves boundary coordinates

Appendix V to Part 922, Subpart P—Sanctuary Preservation Areas boundary coordinates

Appendix VI to Part 922, Subpart P—Special-use Areas boundary coordinates and use designations

Appendix VII to Part 922, Subpart P—Areas To Be Avoided boundary coordinates

Appendix VIII to Part 922, Subpart P—Marine Life Rule

**Authority:** Sections 302, 303, 304, 305, 307, 310 and 312 of National Marine Sanctuaries Act (NMSA) (16 U.S.C. 1431 et seq.) and Sections 5, 6 and 7 of the Florida Keys National Marine Sanctuary and Protection Act, Pub. L. 101-605, 104 Stat. 3090-3093.

### § 922.160 Purpose.

The purpose of the regulations in this part is to implement the comprehensive management plan for the Florida Keys National Marine Sanctuary by regulating activities affecting the resources of the Sanctuary or any of the qualities, values, or purposes for which the Sanctuary is designated, in order to



protect, preserve and manage the conservation, ecological, recreational, research, educational, historical, and aesthetic resources and qualities of the area. In particular, the regulations in this part are intended to protect, restore, and enhance the living resources of the Sanctuary, to contribute to the maintenance of natural assemblages of living resources for future generations, to provide places for species dependent on such living resources to survive and propagate, to facilitate to the extent compatible with the primary objective of resource protection all public and private uses of the resources of the Sanctuary not prohibited pursuant to other authorities, to reduce conflicts between such compatible uses, and to achieve the other policies and purposes of the Florida Keys National Marine Sanctuary and Protection Act and the National Marine Sanctuaries Act.

#### **§ 922.161 Boundary.**

The Sanctuary consists of all submerged lands and waters from the mean high water mark to the boundary described in Appendix I to this part, with the exception of areas within the Dry Tortugas National Park. Appendix I to this part sets forth the precise Sanctuary boundary established by the Florida Keys National Marine Sanctuary and Protection Act. (See FKNMSPA § 5(b)(2)).

#### **§ 922.3 Definitions applicable to all National Marine Sanctuaries.**

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Assistant Administrator means the Assistant Administrator for Ocean Services and Coastal Zone Management, National Oceanic and Atmospheric Administration (NOAA), or designee.

Benthic community means the assemblage of organisms, substrate, and structural formations found at or near the bottom that is periodically or permanently covered by water.

Commercial fishing means any activity that results in the sale or trade for intended profit of fish, shellfish, algae, or corals.

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Cultural resource means any historical or cultural feature, including archaeological site, historic structure, shipwreck, and artifact.

Director means, except where otherwise specified, the Director of the Office of Ocean and Coastal Resource Management, NOAA, or designee.

Exclusive economic zone means the exclusive economic zone as defined in the Magnuson Fishery Conservation and Management Act, 16 U.S. 1801 et seq.

Fish wastes means waste materials resulting from commercial fish processing operations.

Historical resource means any resource possessing historical, cultural, archaeological or paleontological significance, including sites, contextual information, structures, districts, and objects significantly associated with or representative of earlier people, cultures, maritime heritage, and human activities and events. Historical resources include "submerged cultural resources", and also include "historical properties," as defined in the National Historic Preservation Act, as amended, and its implementing regulations, as amended.

Indian tribe means any American Indian tribe, band, group, or community recognized as such by the Secretary of the Interior.

Injure means to change adversely, either in the short or long term, a chemical, biological or physical attribute of, or the viability of. This includes, but is not limited to, to cause the loss of or destroy.

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Marine means those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands over which the United States exercises jurisdiction, including the exclusive economic zone, consistent with international law.

Mineral means clay, stone, sand, gravel, metalliferous ore, nonmetalliferous ore, or any other solid material or other matter of commercial value.

National historic landmark means a district, site, building, structure or object designated as such by the Secretary of the Interior under the National Historic Landmarks Program (36 CFR part 65).

National Marine Sanctuary means an area of the marine environment of special national significance due to its resource or human-use values, which is designated as such to ensure its conservation and management.

Person means any private individual, partnership, corporation or other entity; or any officer, employee, agent, department, agency or instrumentality of the Federal government, of any State or local unit of government, or of any foreign government.

Regional Fishery Management Council means any fishery council established under section 302 of the Magnuson Fishery Conservation and Management Act, 16 U.S.C. 1801 et seq.

Sanctuary quality means any of those ambient conditions, physical-chemical characteristics and natural processes, the maintenance of which is essential to the ecological health of the Sanctuary, including, but not limited to, water quality, sediment quality and air quality.

Sanctuary resource means any living or non-living resource of a National Marine Sanctuary that contributes to the conservation, recreational, ecological, historical, research, educational, or aesthetic value of the Sanctuary, including, but not limited to, the substratum of the area of the Sanctuary, other submerged features and the surrounding seabed, carbonate rock, corals and other bottom formations, coralline algae and other marine plants and algae, marine invertebrates, brine-seep biota, phytoplankton, zooplankton, fish, seabirds, sea turtles and other marine reptiles, marine mammals and historical resources.

Secretary means the Secretary of the United States Department of Commerce, or designee.

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State means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, the United States Virgin Islands, Guam, and any other commonwealth, territory, or possession of the United States.

Subsistence use means the customary and traditional use by rural residents of areas near or in the marine environment for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles; and for barter, if for food or non-edible items other than money, if the exchange is of a limited and non-commercial nature.

Take or taking means: (1) For any marine mammal, sea turtle, or seabird listed as either

endangered or threatened pursuant to the Endangered Species Act, to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or injure, or to attempt to engage in any such conduct; (2) For any other marine mammal, sea turtle, or seabird, to harass, hunt, capture, kill, collect or injure, or to attempt to engage in any such conduct. For the purposes of both (1) and (2) of this definition, this includes, but is not limited to, to collect any dead or injured marine mammal, sea turtle or seabird, or any part thereof; to restrain or detain any marine mammal, sea turtle or seabird, or any part thereof, no matter how temporarily; to tag any sea turtle, marine mammal or seabird; to operate a vessel or aircraft or to do any other act that results in the disturbance or molestation of any marine mammal, sea turtle or seabird.

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**§ 922.162 Definitions applicable to the Florida Keys National Marine Sanctuary only.**

(a) The following definitions apply to the Florida Keys National Marine Sanctuary regulations. To the extent that a definition appears in § 922.3 and this section, the definition in this section governs.

Acts means the Florida Keys National Marine Sanctuary and Protection Act, as amended, (FKNMSPA) (Pub. L. 101-605), and the National Marine Sanctuaries Act (NMSA), also known as Title III of the Marine Protection, Research, and Sanctuaries Act, as amended, (MPRSA) (16 U.S.C. § 1431 et seq.).

Adverse effect means any factor, force, or action that independently or cumulatively damages, diminishes, degrades, impairs, destroys, or otherwise harms any Sanctuary resource, as defined in section 302(8) of the NMSA (16 U.S.C. § 1432(8)) and in this section, or any of the qualities, values, or purposes for which the Sanctuary is designated.

Airboat means a vessel operated by means of a motor driven propeller that pushes air for momentum.

Areas To Be Avoided means the areas described in the Federal Register notice of May 9, 1990 (55 Fed. Reg. 19418-19419) in which vessel operations are prohibited pursuant to section 6(a)(1) of the FKNMSPA (see § 922.164(a)). Appendix VII to this part sets forth the geographic coordinates of these areas, including any modifications thereto made in accordance with section 6(a)(3) of the FKNMSPA.

Closed means all entry or use is prohibited.

Coral means the corals of the Class Hydrozoa (stinging and hydrocorals); the Class Anthozoa, Subclass Hexacorallia, Order Scleractinia (stony corals) and Antipatharia (black corals).

Coral area means marine habitat where coral growth abounds including patch reefs, outer bank reefs, deepwater banks, and hardbottoms.

Coral reefs means the hard bottoms, deep-water banks, patch reefs, and outer bank reefs.

Ecological Reserve means an area of the Sanctuary consisting of contiguous, diverse habitats, within which uses are subject to conditions, restrictions and prohibitions, including access restrictions, intended to minimize human influences, to provide natural spawning, nursery, and permanent residence areas for the replenishment and genetic protection of marine life, and also to protect and preserve natural assemblages of habitats and species within areas representing a broad diversity of resources and habitats found within the Sanctuary. Appendix IV to this part sets forth the geographic coordinates of these areas.

Existing Management Area means an area of the Sanctuary that is within or is a resource management area established by NOAA or by another Federal authority of competent jurisdiction as of [insert effective date of these regulations] where protections above and beyond those provided by Sanctuary-wide prohibitions and restrictions are needed to adequately protect resources. Appendix II to this part sets forth the geographic coordinates of these areas.

Exotic species means a species of plant, invertebrate, fish, amphibian, reptile or mammal whose natural zoogeographic range would not have included the waters of the Atlantic Ocean, Caribbean, or Gulf of Mexico without passive or active introduction to such area through anthropogenic means.

Fish means finfish, mollusks, crustaceans, and all forms of marine animal and plant life other than marine mammals and birds.

Fishing means: (1) the catching, taking, or harvesting of fish; (2) the attempted catching, taking, or harvesting of fish; (3) any other activity which can reasonably be expected to result in the catching, taking, or harvesting of fish; or (4) any operation at sea in support of, or in preparation for, any activity described in subparagraphs (1) through (3). Such

term does not include any scientific research activity which is conducted by a scientific research vessel.

Hardbottom means a submerged marine community comprised of organisms attached to exposed solid rock substrate. Hardbottom is the substrate to which corals may attach but does not include the corals themselves.

Idle speed only/no-wake means a speed at which a boat is operated that is no greater than 4 knots or does not produce a wake.

Idle speed only/no-wake zone means a portion of the Sanctuary where the speed at which a boat is operated may be no greater than 4 knots or may not produce a wake.

Live rock means any living marine organism or an assemblage thereof attached to a hard substrate (including dead coral or rock but not individual mollusk shells(e.g., scallops, clams, oysters). Living marine organisms associated with hard bottoms, banks, reefs, and live rock may include, but are not limited to: sea anemones (Phylum Cnidaria: Class Anthozoa: Order Actinaria); sponges (Phylum Porifera); tube worms (Phylum Annelida), including fan worms, feather duster worms, and Christmas tree worms; bryozoans (Phylum Bryozoa); sea squirts (Phylum Chordata); and marine algae, including Mermaid's fan and cups (*Udotea* spp.), coralline algae, green feather, green grape algae (*Caulerpa* spp.) and watercress (*Halimeda* spp.).

Marine life species means any species of fish, invertebrate, or plant included in sections (2), (3), or (4) of Rule 46-42.001, Florida Administrative Code, reprinted in Appendix VIII to this part.

Military activity means an activity conducted by the Department of Defense with or without participation by foreign forces, other than civil engineering and other civil works projects conducted by the U.S. Army Corps of Engineers.

No-access buffer zone means a portion of the Sanctuary where vessels are prohibited from entering regardless of the method of propulsion.

No motor zone means an area of the Sanctuary where the use of internal combustion motors is prohibited. A vessel with an internal combustion motor may access a no motor zone only through the use of a push pole, paddle, sail, electric motor or similar means of operation but is prohibited from using it's internal combustion motor.

Not available for immediate use means that is not readily accessible for immediate use, e.g., by being stowed in a cabin, locker, or similar storage area, or by being securely covered and lashed to a deck or bulkhead.

Officially marked channel means a channel marked by Federal, State of Florida, or Monroe County officials of competent jurisdiction with navigational aids except for channels marked idle speed only/no wake.

Personal watercraft means any jet or air-powered watercraft, including class A-1 or A-2 vessels, designed to be operated by standing, sitting, or kneeling on or behind the vessel and that uses an engine to power a water jet pump for propulsion, in contrast to a conventional boat, which uses a propeller and where the operator stands or sits inside the vessel.

Prop dredging means the use of a vessel's propulsion wash to dredge or otherwise alter the seabed of the Sanctuary. Prop dredging includes, but is not limited to, the use of propulsion wash deflectors or similar means of dredging or otherwise altering the seabed of the Sanctuary. Prop dredging does not include the disturbance to bottom sediments resulting from normal vessel propulsion.

Prop scarring means the injury to seagrasses or other immobile organisms attached to the seabed of the Sanctuary caused by operation of a vessel in a manner that allows its propeller or other running gear, or any part thereof, to cause such injury (e.g., cutting seagrass rhizomes). Prop scarring does not include minor disturbances to bottom sediments or seagrass blades resulting from normal vessel propulsion.

Residential shoreline means any man-made or natural a) shoreline, b) canal mouth, c) basin, or d) cove adjacent to any residential land use district, including improved subdivision, suburban residential or suburban residential limited, sparsely settled, urban residential, and urban residential mobile home under the Monroe County land development regulations.

Sanctuary means the Florida Keys National Marine Sanctuary.

Sanctuary Preservation Area means an area of the Sanctuary that encompasses a discrete, biologically important area, within which uses are subject to conditions, restrictions and prohibitions, including access restrictions, to avoid concentrations of uses

that could result in significant declines in species populations or habitat, to reduce conflicts between uses, to protect areas that are critical for sustaining important marine species or habitats, or to provide opportunities for scientific research. Appendix V to this part sets forth the geographic coordinates of these areas.

Sanctuary wildlife means any species of fauna, including avifauna, that occupy or utilize the submerged resources of the Sanctuary as nursery areas, feeding grounds, nesting sites, shelter, or other habitat during any portion of their life cycles.

Seagrass means any species of marine angiosperms (flowering plants) that inhabit portions of the seabed in the Sanctuary. Those species include, but are not limited to: *Thalassia testudinum* (turtle grass); *Syringodium filiforme* (manatee grass); *Halodule wrightii* (shoal grass); *Halophila decipiens*, *H. engelmannii*, *H. johnsonii*; and *Ruppia maritima*.

Special-use Area means an area of the Sanctuary set aside for scientific research and educational purposes, recovery or restoration of Sanctuary resources, monitoring, to prevent use or user conflicts, to facilitate access and use, or to promote public use and understanding of Sanctuary resources. Appendix VI to this part sets forth the geographic coordinates of these areas.

Tank vessel means any vessel that is constructed or adapted to carry, or that carries, oil or hazardous material in bulk as cargo or cargo residue, and that— (A) is a United States flag vessel; (B) operates on the navigable waters of the United States; or (C) transfers oil or hazardous material in a port or place subject to the jurisdiction of the United States [46 U.S.C. 2101].

Traditional fishing means those commercial or recreational fishing activities that were customarily conducted within the Sanctuary prior to its designation as identified in the Environmental Impact Statement and Management Plan for this Sanctuary.

Tropical fish means any species included in section (2) of Rule 46-42.001, Florida Administrative Code, reproduced in Appendix VIII to this part, or any part thereof.

Vessel means a watercraft of any description, including, but not limited to, motorized and non-motorized watercraft, personal watercraft, airboats, and float planes while maneuvering on the water, capable of being used as a means of transportation

in/on the waters of the Sanctuary. For purposes of this part, the terms "vessel," "watercraft," and "boat" have the same meaning.

**Wildlife Management Area** means an area of the Sanctuary established for the management, protection, and preservation of Sanctuary wildlife resources, including such an area established for the protection and preservation of endangered or threatened species or their habitats, within which access is restricted to minimize disturbances to Sanctuary wildlife; to ensure protection and preservation consistent with the Sanctuary designation and other applicable law governing the protection and preservation of wildlife resources in the Sanctuary. Appendix III lists these areas and their access restrictions.

(b) Other terms appearing in the regulations in this part are defined at 15 CFR 922.3, and/or in the Marine Protection, Research, and Sanctuaries Act (MPRSA), as amended, 33 U.S.C. 1401 et seq. and 16 U.S.C. 1431 et seq.

#### **§ 922.42 Allowed activities.**

All activities (e.g., fishing, boating, diving, research, education) may be conducted unless prohibited or otherwise regulated in subparts F through P, subject to any emergency regulations promulgated pursuant to §§ 922.44, 922.111(c), or 922.165, subject to all prohibitions, regulations, restrictions, and conditions validly imposed by any Federal, State, or local authority of competent jurisdiction, including Federal and State fishery management authorities, and subject to the provisions of § 312 of the Act. The Assistant Administrator may only directly regulate fishing activities pursuant to the procedure set forth in § 304(a)(5) of the NMSA.

#### **§ 922.163 Prohibited activities - Sanctuary-wide.**

(a) Except as specified in paragraph (b) through (e) of this section, the following activities are prohibited and thus are unlawful for any person to conduct or to cause to be conducted:

(1) Mineral and hydrocarbon exploration, development and production. Exploring for, developing, or producing minerals or hydrocarbons within the Sanctuary.

(2) Removal of, injury to, or possession of coral or live rock. (i) Moving, removing, taking, harvesting, damaging, disturbing, breaking, cutting, or otherwise injuring, or possessing (regardless of where taken from) any living or dead coral, or coral formation, or

attempting any of these activities, except as permitted under 50 CFR part 638.

(ii) Harvesting, or attempting to harvest, any live rock from the Sanctuary, or possessing (regardless of where taken from) any live rock within the Sanctuary, except as authorized by a permit for the possession or harvest from aquaculture operations in the Exclusive Economic Zone, issued by the National Marine Fisheries Service pursuant to applicable regulations under the appropriate Fishery Management Plan, or as authorized by the applicable State authority of competent jurisdiction within the Sanctuary for live rock cultured on State submerged lands leased from the State of Florida, pursuant to applicable State law. See § 370.027, Florida Statutes and implementing regulations.

(3) Alteration of, or construction on, the seabed. Drilling into, dredging, or otherwise altering the seabed of the Sanctuary, or engaging in proddredging; or constructing, placing or abandoning any structure, material, or other matter on the seabed of the Sanctuary, except as an incidental result of:

(i) Anchoring vessels in a manner not otherwise prohibited by this part (see §§ 922.163(a)(5)(ii) and 922.164(d)(1)(v));

(ii) Traditional fishing activities not otherwise prohibited by this part;

(iii) Installation and maintenance of navigational aids by, or pursuant to valid authorization by, any Federal, State, or local authority of competent jurisdiction;

(iv) Harbor maintenance in areas necessarily associated with Federal water resource development projects in existence on [insert effect date of these regulations], including maintenance dredging of entrance channels and repair, replacement, or rehabilitation of breakwaters or jetties;

(v) Construction, repair, replacement, or rehabilitation of docks, seawalls, breakwaters, piers, or marinas with less than ten slips authorized by any valid lease, permit, license, approval, or other authorization issued by any Federal, State, or local authority of competent jurisdiction.

(4) Discharge or deposit of materials or other matter. (i) Discharging or depositing, from within the boundary of the Sanctuary, any material or other matter, except:

(A) Fish, fish parts, chumming materials, or bait

used or produced incidental to and while conducting a traditional fishing activity in the Sanctuary;

(B) Biodegradable effluent incidental to vessel use and generated by a marine sanitation device approved in accordance with Section 312 of the Federal Water Pollution Control Act, as amended, (FWPCA), 33 U.S.C. 1322 et seq.;

(C) Water generated by routine vessel operations (e.g., deck wash down and graywater as defined in section 312 of the FWPCA), excluding oily wastes from bilge pumping; or

(D) Cooling water from vessels or engine exhaust;

(ii) Discharging or depositing, from beyond the boundary of the Sanctuary, any material or other matter that subsequently enters the Sanctuary and injures a Sanctuary resource or quality, except those listed in paragraph (a)(4)(i)(A) through (D) above and those authorized under Monroe County land use permits.

(5) Operation of vessels.

(i) Operating a vessel in such a manner as to strike or otherwise injure coral, seagrass, or any other immobile organism attached to the seabed, including, but not limited to, operating a vessel in such a manner as to cause prop-scarring.

(ii) Anchoring a vessel on coral other than hardbottom in water depths less than 40 feet when visibility is such that the seabed can be seen.

(iii) Except in officially marked channels, operating a vessel at a speed greater than 4 knots or in manner which creates a wake:

(A) within an area designated idle speed only/no wake;

(B) within 100 yards of navigational aids indicating emergent or shallow reefs (international diamond warning symbol);

(C) within 100 feet of the red and white "divers down" flag (or the blue and white "alpha" flag in Federal waters);

(D) within 100 yards of residential shorelines; or

(E) within 100 yards of stationary vessels.

(iv) Operating a vessel in such a manner as to injure, take or cause disturbance to wading, roosting, or nesting birds or marine mammals.

(v) Operating a vessel in a manner which unreasonably or unnecessarily endangers life, limb, marine resources, or property, including but not limited to, weaving through congested vessel traffic, jumping

the wake of another vessel unreasonably or unnecessarily close to such other vessel or when visibility around such other vessel is obstructed, or waiting until the last possible moment to avoid a collision.

(6) Conduct of diving/snorkeling without flag. Diving or snorkeling without flying in a conspicuous manner the red and white "divers down" flag (or the blue and white "alpha" flag in Federal waters).

(7) Release of exotic species. Introducing or releasing an exotic species of plant, invertebrate, fish, amphibian, or mammals into the Sanctuary.

(8) Damage or removal of markers. Marking, defacing, or damaging in any way or displacing, removing, or tampering with any official signs, notices, or placards, whether temporary or permanent, or with any navigational aids, monuments, stakes, posts, mooring buoys, boundary buoys, trap buoys, or scientific equipment.

(9) Movement of, removal of, injury to, or possession of Sanctuary historical resources. Moving, removing, injuring, or possessing, or attempting to move, remove, injure, or possess, a Sanctuary historical resource.

(10) Take or possession of protected wildlife. Taking any marine mammal, sea turtle, or seabird in or above the Sanctuary, except as authorized by the Marine Mammal Protection Act, as amended, (MMPA), 16 U.S.C. 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA) 16 U.S.C. 703 et seq.

(11) Possession or use of explosives or electrical charges. Possessing, or using explosives, except powerheads, or releasing electrical charges within the Sanctuary.

(12) Harvest or possession of marine life species. Harvesting, possessing, or landing any marine life species, or part thereof, within the Sanctuary, except in accordance with rules 46-42.001 through 46-42.003, 46-42.0035, and 46-42.004 through 46-42.007, and 46.42.009 of the Florida Administrative Code, reproduced in Appendix VIII to this part, and such rules shall apply *mutatis mutandis* (with necessary editorial changes) to all Federal and State waters within the Sanctuary.

(13) Interference with law enforcement. Interfering with, obstructing, delaying or preventing an investigation, search, seizure, or disposition of seized

property in connection with enforcement of the Acts or any regulation or permit issued under the Acts.

(b) Notwithstanding the prohibitions in this section and in § 922.164, and any access and use restrictions imposed pursuant thereto, a person may conduct an activity specifically authorized by, and conducted in accordance with the scope, purpose, terms, and conditions of, a National Marine Sanctuary permit issued pursuant to § 922.166.

(c) Notwithstanding the prohibitions in this section and in § 922.164, and any access and use restrictions imposed pursuant thereto, a person may conduct an activity specifically authorized by a valid Federal, State, or local lease, permit, license, approval, or other authorization in existence on [insert the effective date of these regulations], or by any valid right of subsistence use or access in existence [insert the effective date of these regulations], provided that the holder of such authorization or right complies with § 922.167 and with any terms and conditions on the exercise of such authorization or right imposed by the Director as a condition of certification as he or she deems reasonably necessary to achieve the purposes for which the Sanctuary was designated.

(d) Notwithstanding the prohibitions in this section and in § 922.164, and any access and use restrictions imposed pursuant thereto, a person may conduct an activity specifically authorized by any valid Federal, State, or local lease, permit, license, approval, or other authorization issued after [insert the effective date of these regulations], provided that the applicant complies with § 922.168, the Director notifies the applicant and authorizing agency that he or she does not object to issuance of the authorization, and the applicant complies with any terms and conditions the Director deems reasonably necessary to protect Sanctuary resources and qualities. Amendments, renewals and extensions of authorizations in existence on [insert the effective date of these regulations] constitute authorizations issued after [insert the effective date of these regulations].

(e)(1) All military activities shall be carried out in a manner that avoids to the maximum extent practical any adverse impacts on Sanctuary resources and qualities. The prohibitions in paragraph (a) of this section and § 922.164 do not apply to existing classes of military activities which were conducted prior to the effective date of these regulations, as identified in the Environmental Impact Statement and Management Plan for the Sanctuary. New military activities in the Sanctuary are allowed and may be

exempted from the prohibitions in paragraph (a) of this section and in § 922.164 by the Director after consultation between the Director and the Department of Defense pursuant to section 304(d) of the NMSA. When a military activity is modified such that it is likely to destroy, cause the loss of, or injure a Sanctuary resource or quality in a manner significantly greater than was considered in a previous consultation under section 304(d) of the NMSA, or it is likely to destroy, cause the loss of, or injure a Sanctuary resource or quality not previously considered in a previous consultation under section 304(d) of the NMSA, the activity is considered a new activity for purposes of this paragraph. If it is determined that an activity may be carried out, such activity shall be carried out in a manner that avoids to the maximum extent practical any adverse impact on Sanctuary resources and qualities.

(2) In the event of threatened or actual destruction of, loss of, or injury to a Sanctuary resource or quality resulting from an untoward incident, including but not limited to spills and groundings caused by the Department of Defense, the cognizant component shall promptly coordinate with the Director for the purpose of taking appropriate actions to prevent, respond to or mitigate the harm and, if possible, restore or replace the Sanctuary resource or quality.

(f) The prohibitions contained in paragraph (a)(5) of this section do not apply to Federal, State and local officers while performing enforcement duties and/or responding to emergencies that threaten life, property, or the environment in their official capacity.

(g) Notwithstanding paragraph (b) of this section and paragraph (a) of § 922.168, in no event may the Director issue a permit under § 922.166 authorizing, or otherwise approve, the exploration for, leasing, development, or production of minerals or hydrocarbons within the Sanctuary, the disposal of dredged material within the Sanctuary other than in connection with beach renourishment or Sanctuary restoration projects, or the discharge of untreated or primary treated sewage (except by a certification, pursuant to § 922.167, of a valid authorization in existence on [insert effective date of these regulations]), and any purported authorizations issued by other authorities after [insert the effective date of these regulations] for any of these activities within the Sanctuary shall be invalid.

**§ 922.164 Additional activity regulations by Sanctuary area.**

In addition to the prohibitions set forth in § 922.163, which apply throughout the Sanctuary, the following regulations apply with respect to activities conducted within the Sanctuary areas described in this section and in Appendix (II) through (VII) to this part. Activities located within two or more overlapping Sanctuary areas are concurrently subject to the regulations applicable to each overlapping area.

(a) Areas To Be Avoided. Operating a tank vessel or a vessel greater than 50 meters in registered length is prohibited in all areas to be avoided, except if such vessel is a public vessel and its operation is essential for national defense, law enforcement, or responses to emergencies that threaten life, property, or the environment. Appendix VII to this part sets forth the geographic coordinates of these areas.

(b) Existing Management Areas.

(1) Key Largo and Looe Key Management Areas. The following activities are prohibited within the Key Largo and Looe Key Management Areas (also known as the Key Largo and Looe Key National Marine Sanctuaries) described in Appendix II to this part:

(i) Removing, taking, damaging, harmfully disturbing, breaking, cutting, spearing or similarly injuring any coral or other marine invertebrate, or any plant, soil, rock, or other material, except commercial taking of spiny lobster and stone crab by trap and recreational taking of spiny lobster by hand or by hand gear which is consistent with these regulations and the applicable regulations implementing the applicable Fishery Management Plan.

(ii) Taking any tropical fish.

(iii) Fishing with wire fish traps, bottom trawls, dredges, fish sleds, or similar vessel-towed or anchored bottom fishing gear or nets.

(iv) Fishing with, carrying or possessing, except while passing through without interruption or for law enforcement purposes: pole spears, air rifles, bows and arrows, slings, Hawaiian slings, rubber powered arbaletes, pneumatic and spring-loaded guns or similar devices known as spearguns.

(2) Great White Heron and Key West National Wildlife Refuge Management Areas. The following activities are prohibited within the marine portions of

the Great White Heron and Key West National Wildlife Refuge Management Areas described in Appendix II to this part:

(i) Operating a personal watercraft, operating an airboat, or water skiing except within Township 66 South, Range 29 East, Sections 5, 11, 12 and 14; Township 66 South, Range 28 East, Section 2; Township 67 South, Range 26 East, Sections 16 and 20, all Tallahassee Meridian.

(ii) Discharging or depositing any material or other matter except cooling water or engine exhaust.

(c) Wildlife Management Areas. (1) Marine portions of the Wildlife Management Areas listed in Appendix III to this part or portions thereof may be designated "idle speed only/no-wake," "no-motor" or "no-access buffer" zones or "closed". The Director, in cooperation with other Federal, State, or local resource management authorities, as appropriate, shall post signs conspicuously, using mounting posts, buoys, or other means according to location and purpose, at appropriate intervals and locations, clearly delineating an area as an "idle speed only/no wake", a "no-motor", or a "no-access buffer" zone or as "closed", and allowing instant, long-range recognition by boaters. Such signs shall display the official logo of the Sanctuary.

(2) The following activities are prohibited within the marine portions of the Wildlife Management Areas listed in Appendix III to this part:

(i) In those marine portions of any Wildlife Management Area designated an "idle speed only/no wake" zone in Appendix III to this part, operating a vessel at a speed greater than idle speed only/no wake.

(ii) In those marine portions of any Wildlife Management Area designated a "no-motor" zone in Appendix III to this part, using internal combustion motors or engines for any purposes. A vessel with an internal combustion motor or engine may access a "no-motor" zone only through the use of a push pole, paddle, sail, electric motor or similar means of propulsion.

(iii) In those marine portions of any Wildlife Management Area designated a "no-access buffer" zone in Appendix III of this part, entering the area by vessel.



(iv) In those marine portions of any Wildlife Management Area designated as closed in Appendix III of this part, entering or using the area.

(v) Discharging or depositing any material or other matter except cooling water or engine exhaust.

(3) The Director shall coordinate with other Federal, State, or local resource management authorities, as appropriate, in the establishment and enforcement of access restrictions described in (c)(2)(i)-(iv) of this section in the marine portions of Wildlife Management Areas.

(4) The Director may modify the number and location of access restrictions described in (c)(2)(i)-(iv) of this section within the marine portions of a Wildlife Management Area if the Director finds that such action is reasonably necessary to minimize disturbances to Sanctuary wildlife, or to ensure protection and preservation of Sanctuary wildlife consistent with the purposes of the Sanctuary designation and other applicable law governing the protection and preservation of wildlife resources in the Sanctuary. The Director will effect such modification by:

(i) publishing in the Federal Register, after notice and an opportunity for public comments in accordance, an amendment to the list of such areas set forth in Appendix III to this part, and a notice regarding the time and place where maps depicting the precise locations of such restrictions will be made available for public inspection, and (ii) posting official signs delineating such restrictions in accordance with subparagraph (c)(1).

**(d) Ecological Reserves and Sanctuary Preservation Areas.** (1) The following activities are prohibited within the Ecological Reserves described in Appendix IV to this part, and within the Sanctuary Preservation Areas, described in Appendix V to this part:

(i) Discharging or depositing any material or other matter except cooling water or engine exhaust.

(ii) Possessing, moving, harvesting, removing, taking, damaging, disturbing, breaking, cutting, spearing, or otherwise injuring any coral, marine invertebrate, fish, bottom formation, algae, seagrass or other living or dead organism, including shells, or attempting any of these activities. However, fish, invertebrates, and marine plants may be possessed aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such resources can be shown not to have been harvested within, removed from, or taken within, the Ecological Reserve

or Sanctuary Preservation Area, as applicable, by being stowed in a cabin, locker, or similar storage area prior to entering and during transit through such reserves or areas.

(iii) Except for catch and release fishing by trolling in the Conch Reef, Alligator Reef, Sombrero Reef, and Sand Key SPAs, fishing by any means. However, gear capable of harvesting fish may be aboard a vessel in an Ecological Reserve or Sanctuary Preservation Area, provided such gear is not available for immediate use when entering and during transit through such Ecological Reserve or Sanctuary Preservation Area, and no presumption of fishing activity shall be drawn therefrom.

(iv) Touching living or dead coral, including but not limited to, standing on a living or dead coral formation.

(v) Placing any anchor in a way that allows the anchor or any portion of the anchor apparatus (including the anchor, chain or rope) to touch living or dead coral, or any attached organism. When anchoring dive boats, the first diver down must inspect the anchor to ensure that it is not touching living or dead coral, and will not shift in such a way as to touch such coral or other attached organisms. No further diving shall take place until the anchor is placed in accordance with these requirements.

(vi) Anchoring instead of mooring when a mooring buoy is available or anchoring in other than a designated anchoring area when such areas have been designated and are available.

(vii) Except for passage without interruption through the area, for law enforcement purposes, or for purposes of monitoring pursuant to paragraph (d)(2), violating a temporary access restriction imposed by the Director pursuant to paragraph (d)(2).

(2) The Director may temporarily restrict access to any portion of any Sanctuary Preservation Area or Ecological Reserve if the Director, on the basis of the best available data, information and studies, determines that a concentration of use appears to be causing or contributing to significant degradation of the living resources of the area and that such action is reasonably necessary to allow for recovery of the living resources of such area. The Director will provide for continuous monitoring of the area during the pendency of the restriction. The Director will provide public notice of the restriction by publishing a notice in the Federal Register, and by such other means as the Director may deem appropriate. The

Director may only restrict access to an area for a period of 60 days, with one additional 60 day renewal. The Director may restrict access to an area for a longer period pursuant to a notice and opportunity for public comment rulemaking under the Administrative Procedure Act. Such restriction will be kept to the minimum amount of area necessary to achieve the purposes thereof.

(e) **Special-use Areas.** (1) The Director may set aside discrete areas of the Sanctuary as Special-use Areas, and, by designation pursuant to this paragraph, impose the access and use restrictions specified in subparagraph (e)(3). Special-use Areas are described in Appendix VI to this part, in accordance with the following designations and corresponding objectives:

(i) "Recovery area" to provide for the recovery of Sanctuary resources from degradation or other injury attributable to human uses;

(ii) "Restoration area" to provide for restoration of degraded or otherwise injured Sanctuary resources;

(iii) "Research-only area" to provide for scientific research or education relating to protection and management, through the issuance of a Sanctuary General permit for research pursuant to § 922.166 of these regulations; and

(iv) "Facilitated-use area" to provide for the prevention of use or user conflicts or the facilitation of access and use, or to promote public use and understanding, of Sanctuary resources through the issuance of special-use permits.

(2) A Special-use Area shall be no larger than the size the Director deems reasonably necessary to accomplish the applicable objective.

(3) Persons conducting activities within any Special-use Area shall comply with the access and use restrictions specified in this paragraph and made applicable to such area by means of its designation as a "recovery area," "restoration area," "research-only area," or "facilitated-use area." Except for passage without interruption through the area or for law enforcement purposes, no person may enter a Special-use Area except to conduct or cause to be conducted the following activities:

(i) in such area designated as a "recovery area" or a "restoration area", habitat manipulation related to restoration of degraded or otherwise injured Sanctuary resources, or activities reasonably necessary to

monitor recovery of degraded or otherwise injured Sanctuary resources;

(ii) in such area designated as a "research only area", scientific research or educational use specifically authorized by and conducted in accordance with the scope, purpose, terms and conditions of a valid National Marine Sanctuary General or Historical Resources permit, or

(iii) in such area designated as a "facilitated-use area", activities specified by the Director or specifically authorized by and conducted in accordance with the scope, purpose, terms, and conditions of a valid Special-use permit.

(4)(i) The Director may modify the number of, location of, or designations applicable to, Special-use Areas by publishing in the Federal Register, after notice and an opportunity for public comment in accordance with the Administrative Procedure Act, an amendment to Appendix VI to this part, except that, with respect to such areas designated as a "recovery area," "restoration area," or "research only area," the Director may modify the number of, location of, or designation applicable to, such areas by publishing a notice of such action in the Federal Register if the Director determines that immediate action is reasonably necessary to:

(A) prevent significant injury to Sanctuary resources where circumstances create an imminent risk to such resources;

(B) initiate restoration activity where a delay in time would significantly impair the ability of such restoration activity to succeed;

(C) initiate research activity where an unforeseen natural event produces an opportunity for scientific research that may be lost if research is not initiated immediately.

(ii) If the Director determines that a notice of modification must be promulgated immediately in accordance with subparagraph (4)(i), the Director will, as part of the same notice, invite public comment and specify that comments will be received for 15 days after the effective date of the notice. As soon as practicable after the end of the comment period, the Director will either rescind, modify or allow the modification to remain unchanged through notice in the Federal Register.

#### **§ 922.165 Emergency regulations.**

Where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary

resource or quality, or minimize the imminent risk of such destruction, loss, or injury, any and all activities are subject to immediate temporary regulation, including prohibition. Any such temporary regulation may be in effect for up to 60 days, with one 60-day extension. Additional or extended action will require notice and comment rulemaking under the Administrative Procedure Act, notice in local newspapers, notice to Mariners, and press releases.

#### **§ 922.45 Penalties.**

(a) Each violation of the NMSA or FKNMSPA, any regulation in this part, or any permit issued pursuant thereto, is subject to a civil penalty of not more than \$100,000. Each day of a continuing violation constitutes a separate violation.

(b) Regulations setting forth the procedures governing administrative proceedings for assessment of civil penalties, permit sanctions, and denials for enforcement reasons, issuance and use of written warnings, and release or forfeiture of seized property appear at 15 CFR part 904.

#### **§ 922.46 Response costs and damages.**

Under section 312 of the Act, any person who destroys, causes the loss of, or injures any Sanctuary resource is liable to the United States for response costs and damages resulting from such destruction, loss or injury, and any vessel used to destroy, cause the loss of, or injure any Sanctuary resource is liable *in rem* to the United States for response costs and damages resulting from such destruction, loss or injury.

#### **§ 922.166 Permits - application procedures and issuance criteria.**

##### **(a) National Marine Sanctuary General Permit.**

(1) A person may conduct an activity prohibited by §§ 922.163 or 922.164, other than an activity involving the survey/inventory, research/recovery, or deaccession/transfer of Sanctuary historical resources, if such activity is specifically authorized by, and provided such activity is conducted in accordance with the scope, purpose, terms and conditions of, a National Marine Sanctuary General permit issued under this paragraph (a).

(2) The Director, at his or her discretion, may issue a General permit under this paragraph (a), subject to such terms and conditions as he or she deems appropriate, if the Director finds that the

activity will: (i) further research or monitoring related to Sanctuary resources and qualities; (ii) further the educational value of the Sanctuary; (iii) further the natural or historical resource value of the Sanctuary; (iv) further salvage or recovery operations in or near the Sanctuary in connection with a recent air or marine casualty; (v) assist in managing the Sanctuary; or (vi) otherwise further Sanctuary purposes, including facilitating multiple use of the Sanctuary, to the extent compatible with the primary objective of resource protection.

(3) The Director shall not issue a General permit under this paragraph (a), unless the Director also finds that: (i) the applicant is professionally qualified to conduct and complete the proposed activity; (ii) the applicant has adequate financial resources available to conduct and complete the proposed activity; (iii) the duration of the proposed activity is no longer than necessary to achieve its stated purpose; (iv) the methods and procedures proposed by the applicant are appropriate to achieve the proposed activity's goals in relation to the activity's impacts on Sanctuary resources and qualities; (v) the proposed activity will be conducted in a manner compatible with the primary objective of protection of Sanctuary resources and qualities, considering the extent to which the conduct of the activity may diminish or enhance Sanctuary resources and qualities, any indirect, secondary or cumulative effects of the activity, and the duration of such effects; (vi) it is necessary to conduct the proposed activity within the Sanctuary to achieve its purposes; and (vii) the reasonably expected end value of the activity to the furtherance of Sanctuary goals and purposes outweighs any potential adverse impacts on Sanctuary resources and qualities from the conduct of the activity. For activities proposed to be conducted within any of the areas described in

§ 922.164(b)-(e), the Director shall not issue a permit unless he or she further finds that such activities will further and are consistent with the purposes for which such area was established, as described in §§ 922.162 and 922.164 and in the management plan for the Sanctuary.

##### **(b) National Marine Sanctuary Survey/Inventory of Historical Resources Permit.**

(1) A person may conduct an activity prohibited by §§ 922.163 or 922.164 involving the survey/inventory of Sanctuary historical resources if such activity is specifically authorized by, and is conducted in accordance with the scope, purpose, terms and conditions of, a Survey/Inventory of Historical Resources permit issued under this paragraph (b).

Such permit is not required if such survey/inventory activity does not involve any activity prohibited by §§ 922.163 or 922.164. Thus, survey/inventory activities that are non-intrusive, do not include any excavation, removal, or recovery of historical resources, and do not result in destruction of, loss of, or injury to Sanctuary resources or qualities do not require a permit. However, if a survey/inventory activity will involve test excavations or removal of artifacts or materials for evaluative purposes, a Survey/Inventory of Historical Resources permit is required. Regardless of whether a Survey/Inventory permit is required, a person may request such permit. Persons who have demonstrated their professional abilities under a Survey/Inventory permit will be given preference over other persons in consideration of the issuance of a Research/Recovery permit. While a Survey/Inventory permit does not grant any rights with regards to areas subject to pre-existing rights of access which are still valid, once a permit is issued for an area, other survey/inventory permits will not be issued for the same area during the period for which the permit is valid.

(2) The Director, at his or her discretion, may issue a Survey/Inventory permit under this paragraph (b), subject to such terms and conditions as he or she deems appropriate, if the Director finds that such activity: (i) satisfies the requirements for a permit issued under paragraph (a)(3) of this section; (ii) either will be non-intrusive, not include any excavation, removal, or recovery of historical resources, and not result in destruction of, loss of, or injury to Sanctuary resources or qualities, or if intrusive, will involve no more than the minimum manual alteration of the seabed and/or the removal of artifacts or other material necessary for evaluative purposes and will cause no significant adverse impacts on Sanctuary resources or qualities; and (iii) that such activity will be conducted in accordance with all requirements of the Programmatic Agreement for the Management of Submerged Cultural Resources in the Florida Keys National Marine Sanctuary among NOAA, The Advisory Council on Historic Preservation, and the State of Florida (hereinafter SCR Agreement), and that such permit issuance is in accordance with such SCR Agreement. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. The SCR Agreement is reproduced in the "Submerged Cultural Resources Action Plan" set forth in Volume 1 of the Florida Keys National Marine Sanctuary Management Plan, dated 1996. Copies of the SCR Agreement may also be examined at, and obtained from, the Sanctuaries and Reserves Division, Office of Ocean and Coastal

Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1305 East-West Highway, 12th floor, Silver Spring, MD 20910; or from the Florida Keys National Marine Sanctuary Office, P.O. Box 500368, Marathon, FL 33050.

(c) National Marine Sanctuary Research/Recovery of Sanctuary Historical Resources Permit.

(1) A person may conduct any activity prohibited by §§ 922.163 or 922.164 involving the research/recovery of Sanctuary historical resources if such activity is specifically authorized by, and is conducted in accordance with the scope, purpose, terms and conditions of, a Research/Recovery of Historical Resources permit issued under this paragraph (c).

(2) The Director, at his or her discretion, may issue a Research/Recovery of Historical Resources permit, under this paragraph (c), and subject to such terms and conditions as he or she deems appropriate, if the Director finds that: (i) such activity satisfies the requirements for a permit issued under paragraph (a)(3) of this section; (ii) the recovery of the resource is in the public interest as described in the SCR Agreement; (iii) recovery of the resource is part of research to preserve historic information for public use; and (iv) recovery of the resource is necessary or appropriate to protect the resource, preserve historical information, and/or further the policies and purposes of the NMSA and the FKNMSPA, and that such permit issuance is in accordance with, and that the activity will be conducted in accordance with, all requirements of the SCR Agreement.

(d) National Marine Sanctuary Special-use Permit.

(1) A person may conduct any commercial or concession-type activity prohibited by §§ 922.163 or 922.164, if such activity is specifically authorized by, and is conducted in accordance with the scope, purpose, terms and conditions of, a Special-use permit issued under this paragraph (d). A Special-use permit is required for the deaccession/transfer of Sanctuary historical resources.

(2) The Director, at his or her discretion, may issue a Special-use permit in accordance with this paragraph (d), and subject to such terms and conditions as he or she deems appropriate and the mandatory terms and conditions of section 310 of the NMSA, if the Director finds that issuance of such permit is reasonably necessary to: (i) establish conditions of access to and use of any Sanctuary

resource; or (ii) promote public use and understanding of any Sanctuary resources. No permit may be issued unless the activity is compatible with the purposes for which the Sanctuary was designated and can be conducted in a manner that does not destroy, cause the loss of, or injure any Sanctuary resource, and if for the deaccession/transfer of Sanctuary Historical Resources, unless such permit issuance is in accordance with, and that the activity will be conducted in accordance with, all requirements of the SCR Agreement.

(3) The Director may assess and collect fees for the conduct of any activity authorized by a Special-use permit issued pursuant to this paragraph (d). No Special-use permit shall be effective until all assessed fees are paid, unless otherwise provided by the Director by a fee schedule set forth as a permit condition. In assessing a fee, the Director shall include:

(i) all costs incurred, or expected to be incurred, in reviewing and processing the permit application, including, but not limited to, costs for: (A) number of personnel; (B) personnel hours; (C) equipment; (D) biological assessments; (E) copying; and (F) overhead directly related to reviewing and processing the permit application;

(ii) all costs incurred, or expected to be incurred, as a direct result of the conduct of the activity for which the Special-use permit is being issued, including, but not limited to: (A) the cost of monitoring the conduct both during the activity and after the activity is completed in order to assess the impacts to Sanctuary resources and qualities; (B) the use of an official NOAA observer, including travel and expenses and personnel hours; and (C) overhead costs directly related to the permitted activity; and

(iii) an amount which represents the fair market value of the use of the Sanctuary resource and a reasonable return to the United States Government.

(4) Nothing in this paragraph (d) shall be considered to require a person to obtain a permit under this paragraph for the conduct of any fishing activities within the Sanctuary.

(e) Applications. (1) Applications for permits should be addressed to the Director, Office of Ocean and Coastal Resource Management; ATTN: Sanctuary Superintendent, Florida Keys National Marine Sanctuary, P.O. Box 500368, Marathon, FL 33050. All applications must include: (i) a detailed description of the proposed activity including a timetable for completion of the activity and the equipment, personnel and methodology to be employed; (ii) the qualifi-

cations and experience of all personnel; (iii) the financial resources available to the applicant to conduct and complete the proposed activity; (iv) a statement as to why it is necessary to conduct the activity within the Sanctuary; (v) the potential impacts of the activity, if any, on Sanctuary resources and qualities; (vi) the benefit to be derived from the activity; and (vii) such other information as the Director may request depending on the type of activity. Copies of all other required licenses, permits, approvals, or other authorizations must be attached to the application.

(2) Upon receipt of an application, the Director may request such additional information from the applicant as he or she deems reasonably necessary to act on the application and may seek the views of any persons. The Director may require a site visit as part of the permit evaluation. Unless otherwise specified, the information requested must be received by the Director within 30 days of the postmark date of the request. Failure to provide such additional information on a timely basis may be deemed by the Director to constitute abandonment or withdrawal of the permit application.

(f) A permit may be issued for a period not exceeding five years. All permits will be reviewed annually to determine the permittee's compliance with permit scope, purpose, terms and conditions and progress toward reaching the stated goals and appropriate action taken under paragraph (g) if warranted. A permittee may request permit renewal pursuant to the same procedures for applying for a new permit. Upon the permittee's request for renewal, the Director shall review all reports submitted by the permittee as required by the permit conditions. In order to renew the permit, the Director must find that the: (i) activity will continue to further the purposes for which the Sanctuary was designated in accordance with the criteria applicable to the initial issuance of the permit; (ii) permittee has at no time violated the permit, or these regulations; and (iii) the activity has not resulted in any unforeseen adverse impacts to Sanctuary resources or qualities.

(g) The Director may amend, suspend, or revoke a permit for good cause. The Director may deny a permit application, in whole or in part, if it is determined that the permittee or applicant has acted in violation of a previous permit, of these regulations, of the NMSA or FKNMSPA, or for other good cause. Any such action shall be communicated in writing to the permittee or applicant by certified mail and shall set forth the reason(s) for the action taken. Procedures governing permit sanctions and denials for

enforcement reasons are set forth in Subpart D of 15 CFR part 904.

(h) The applicant for or holder of a National Marine Sanctuary permit may appeal the denial, conditioning, amendment, suspension or revocation of the permit in accordance with the procedures set forth in § 922.50.

(i) A permit issued pursuant to this section other than a Special-use permit is nontransferable. Special-use permits may be transferred, sold, or assigned with the written approval of the Director. The permittee shall provide the Director with written notice of any proposed transfer, sale, or assignment no less than 30 days prior to its proposed consummation. Transfers, sales, or assignments consummated in violation of this requirement shall be considered a material breach of the Special-use permit, and the permit shall be considered void as of the consummation of any such transfer, sale, or assignment.

(j) The permit or a copy thereof shall be maintained in legible condition on board all vessels or aircraft used in the conduct of the permitted activity and be displayed for inspection upon the request of any authorized officer.

(k) Any permit issued pursuant to this section shall be subject to the following terms and conditions:

(1) All permitted activities shall be conducted in a manner that does not destroy, cause the loss of, or injure Sanctuary resources or qualities, except to the extent that such may be specifically authorized.

(2) The permittee agrees to hold the United States harmless against any claims arising out of the conduct of the permitted activities.

(3) All necessary Federal, State, and local permits from all agencies with jurisdiction over the proposed activities shall be secured before commencing field operations.

(l) In addition to the terms and conditions listed in paragraph (k), any permit authorizing the research/recovery of historical resources shall be subject to the following terms and conditions:

(1) a professional archaeologist shall be in charge of planning, field recovery operations, and research analysis.

(2) an agreement with a conservation laboratory shall be in place before field recovery operations are

begun, and an approved nautical conservator shall be in charge of planning, conducting, and supervising the conservation of any artifacts and other materials recovered.

(3) a curation agreement with a museum or facility for curation, public access and periodic public display, and maintenance of the recovered historical resources shall be in place before commencing field operations (such agreement for the curation and display of recovered historical resources may provide for the release of public artifacts for deaccession/transfer if such deaccession/transfer is consistent with preservation, research, education, or other purposes of the designation and management of the Sanctuary. Deaccession/transfer of historical resources requires a Special-use permit issued pursuant to paragraph (d) and such deaccession/transfer shall be executed in accordance with the requirements of the SCR Agreement).

(4) the site's archaeological information is fully documented, including measured drawings, site maps drawn to professional standards, and photographic records.

(m) In addition to the terms and conditions listed in paragraph (k) and (l), any permit issued pursuant to this section is subject to such other terms and conditions, including conditions governing access to, or use of, Sanctuary resources, as the Director deems reasonably necessary or appropriate and in furtherance of the purposes for which the Sanctuary is designated. Such terms and conditions may include, but are not limited to:

(1) Any data or information obtained under the permit shall be made available to the public.

(2) A NOAA official shall be allowed to observe any activity conducted under the permit.

(3) The permittee shall submit one or more reports on the status, progress, or results of any activity authorized by the permit.

(4) The permittee shall submit an annual report to the Director not later than December 31 of each year on activities conducted pursuant to the permit. The report shall describe all activities conducted under the permit and all revenues derived from such activities during the year and/or term of the permit.

(5) The permittee shall purchase and maintain general liability insurance or other acceptable security against potential claims for destruction, loss of, or

injury to Sanctuary resources arising out of the permitted activities. The amount of insurance or security should be commensurate with an estimated value of the Sanctuary resources in the permitted area. A copy of the insurance policy or security instrument shall be submitted to the Director.

**§ 922.167 Certification of preexisting leases, licenses, permits, approvals, other authorizations, or rights to conduct a prohibited activity.**

(a) A person may conduct an activity prohibited by §§ 922.163 or 922.164 if such activity is specifically authorized by a valid Federal, State, or local lease, permit, license, approval, or other authorization in existence on [insert the effective date of these regulations], or by any valid right of subsistence use or access in existence on [insert the effective date of these regulations], provided that:

1) The holder of such authorization or right notifies the Director, in writing, within 90 days of [insert the effective date of these regulations], of the existence of such authorization or right and requests certification of such authorization or right; 2) the holder complies with the other provisions of this § 922.167; and 3) the holder complies with any terms and conditions on the exercise of such authorization or right imposed as a condition of certification, by the Director, to achieve the purposes for which the Sanctuary was designated.

(b) The holder of an authorization or right described in paragraph (a) above authorizing an activity prohibited by §§ 922.163 or 922.164 may conduct the activity without being in violation of applicable provisions of §§ 922.163 or 922.164, pending final agency action on his or her certification request, provided the holder is in compliance with this § 922.167.

(c) Any holder of an authorization or right described in paragraph (a) above may request the Director to issue a finding as to whether the activity for which the authorization has been issued, or the right given, is prohibited by §§ 922.163 or 922.164, thus requiring certification under this section.

(d) Requests for findings or certifications should be addressed to the Director, Office of Ocean and Coastal Resource Management; ATTN: Sanctuary Superintendent, Florida Keys National Marine Sanctuary, P.O. Box 500368, Marathon, FL 33050. A copy of the lease, permit, license, approval, or other authorization must accompany the request.

(e) The Director may request additional information from the certification requester as he or she deems reasonably necessary to condition appropriately the exercise of the certified authorization or right to achieve the purposes for which the Sanctuary was designated. The information requested must be received by the Director within 45 days of the post-mark date of the request. The Director may seek the views of any persons on the certification request.

(f) The Director may amend any certification made under this § 922.167 whenever additional information becomes available justifying such an amendment.

(g) Upon completion of review of the authorization or right and information received with respect thereto, the Director shall communicate, in writing, any decision on a certification request or any action taken with respect to any certification made under this § 922.167, in writing, to both the holder of the certified lease, permit, license, approval, other authorization, or right, and the issuing agency, and shall set forth the reason(s) for the decision or action taken.

(h) Any time limit prescribed in or established under this § 922.167 may be extended by the Director for good cause.

(i) The holder may appeal any action conditioning, amending, suspending, or revoking any certification in accordance with the procedures set forth in § 922.50.

(j) Any amendment, renewal, or extension made after [insert the effective date of these regulations], to a lease, permit, license, approval, other authorization or right is subject to the provisions of § 922.168.

**§ 922.168 Notification and review of applications for leases, licenses, permits, approvals, or other authorizations to conduct a prohibited activity.**

(a) A person may conduct an activity prohibited by §§ 922.163 or 922.164 if such activity is specifically authorized by any valid Federal, State, or local lease, permit, license, approval, or other authorization issued after [insert effective date of these regulations], provided that: 1) the applicant notifies the Director, in writing, of the application for such authorization (and of any application for an amendment, renewal, or extension of such authorization) within fifteen (15) days of the date of filing of the application

or [insert the effective date of these regulations], whichever is later; 2) the applicant complies with the other provisions of this § 922.168; 3) the Director notifies the applicant and authorizing agency that he or she does not object to issuance of the authorization (or amendment, renewal, or extension); and 4) the applicant complies with any terms and conditions the Director deems reasonably necessary to protect Sanctuary resources and qualities.

(b) Any potential applicant for an authorization described in paragraph (a) above may request the Director to issue a finding as to whether the activity for which an application is intended to be made is prohibited by §§ 922.163 or 922.164.

(c) Notification of filings of applications should be addressed to the Director, Office of Ocean and Coastal Resource Management; ATTN: Sanctuary Superintendent, Florida Keys National Marine Sanctuary, P.O. Box 500368, Marathon, FL 33050. A copy of the application must accompany the notification.

(d) The Director may request additional information from the applicant as he or she deems reasonably necessary to determine whether to object to issuance of an authorization described in paragraph (a) above, or what terms and conditions are reasonably necessary to protect Sanctuary resources and qualities. The information requested must be received by the Director within 45 days of the postmark date of the request. The Director may seek the views of any persons on the application.

(e) The Director shall notify, in writing, the agency to which application has been made of his or her pending review of the application and possible objection to issuance. Upon completion of review of the application and information received with respect thereto, the Director shall notify both the agency and applicant, in writing, whether he or she has an objection to issuance and what terms and conditions he or she deems reasonably necessary to protect Sanctuary resources and qualities, and reasons therefor.

(f) The Director may amend the terms and conditions deemed reasonably necessary to protect Sanctuary resources and qualities whenever additional information becomes available justifying such an amendment.

(g) Any time limit prescribed in or established under this § 922.168 may be extended by the Director for good cause.

(h) The applicant may appeal any objection by, or terms or conditions imposed by, the Director to the Assistant Administrator or designee in accordance with the provisions of § 922.50.

#### **§ 922.50 Appeals of administrative action.**

(a)(1) Except for permit actions taken for enforcement reasons (see subpart D of 15 CFR part 904 for applicable procedures), an applicant for, or a holder of, a National Marine Sanctuary permit, or Special Use permit pursuant to section 310 of the Act; a person requesting certification of an existing lease, permit, license or right of subsistence use or access under § 922.47; or, for those Sanctuaries described in subparts L through P, an applicant for a lease, permit, license or other authorization issued by any Federal, State, or local authority of competent jurisdiction (hereinafter appellant) may appeal to the Assistant Administrator:

(i) The granting, denial, conditioning, amendment, suspension, or revocation by the Director of a National Marine Sanctuary or Special Use permit;

(ii) The conditioning, amendment, suspension, or revocation of a certification under § 922.47; or

(iii) For those Sanctuaries described in subparts L through P, the objection to issuance of or the imposition of terms and conditions on a lease, permit, license, or other authorization issued by any Federal, State, or local authority of competent jurisdiction.

(2) For those National Marine Sanctuaries described in subparts F through K, any interested person may also appeal the same actions described in paragraphs (a)(1)(i) and (ii) of this section. For appeals arising from actions taken with respect to these National Marine Sanctuaries, the term "appellant" includes any such interested persons.

(b) An appeal under paragraph (a) of this section must be in writing, state the action(s) by the Director appealed and the reason(s) for the appeal, and be received within 30 days of receipt of notice of the action by the Director. Appeals should be addressed to the Assistant Administrator, Office of Ocean and Coastal Resource Management, ATTN: Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1305 East-West Highway, Silver Spring, MD 20910.

(c) While the appeal is pending, appellants may not conduct their activities without being subject to the prohibitions in §§ 922.163 and 922.164.



(d)(1) The Assistant Administrator may request the appellant to submit such information as the Assistant Administrator deems reasonably necessary in order for him or her to decide the appeal. The information requested must be received by the Assistant Administrator within 45 days of the post-mark date of the request. The Assistant Administrator may seek the views of any other persons. For the Monitor National Marine Sanctuary, if the appellant has requested a hearing, the Assistant Administrator shall grant an informal hearing. For all other National Marine Sanctuaries, the Assistant Administrator may determine whether to hold an informal hearing on the appeal. If the Assistant Administrator determines that an informal hearing should be held, the Assistant Administrator may designate an officer before whom the hearing shall be held.

(2) The hearing officer shall give notice in the Federal Register of the time, place, and subject matter of the hearing. The appellant and the Director may appear personally or by counsel at the hearing and submit such material and present such arguments as deemed appropriate by the hearing officer. Within 60 days after the record before the hearing officer closes, the hearing officer shall recommend a decision in writing to the Assistant Administrator.

(e) The Assistant Administrator shall decide the appeal using the same regulatory criteria as for the initial decision and shall base the appeal decision on the record before the Director and any information submitted regarding the appeal, and if a hearing has been held, on the record before the hearing officer and the hearing officer's recommended decision. The Assistant Administrator shall notify the appellant of the final decision and the reason(s) therefore in writing. The Assistant Administrator's decision shall constitute final agency action for purposes of the Administrative Procedure Act.

(f) Any time limit prescribed in or established under this section other than the 30-day limit for filing an appeal may be extended by the Assistant Administrator or hearing officer for good cause.

**Appendix I to Part 922, Subpart P—Florida Keys National Marine Sanctuary boundary coordinates**

(Appendix based on North American Datum of 1983)

The boundary of the Florida Keys National Marine Sanctuary—

(a) begins at the northeasternmost point of Biscayne National Park located at approximately 25

degrees 39 minutes north latitude, 80 degrees 5 minutes west longitude, then runs eastward to the 300-foot isobath located at approximately 25 degrees 39 minutes north latitude, 80 degrees 4 minutes west longitude;

(b) then runs southward and connects in succession the points at the following coordinates:

(i) 25 degrees 34 minutes north latitude, 80 degrees 4 minutes west longitude,

(ii) 25 degrees 28 minutes north latitude, 80 degrees 5 minutes west longitude, and

(iii) 25 degrees 21 minutes north latitude, 80 degrees 7 minutes west longitude;

(iv) 25 degrees 16 minutes north latitude, 80 degrees 8 minutes west longitude;

(c) then runs southwesterly approximating the 300-foot isobath and connects in succession the points at the following coordinates:

(i) 25 degrees 7 minutes north latitude, 80 degrees 13 minutes west longitude,

(ii) 24 degrees 57 minutes north latitude, 80 degrees 21 minutes west longitude,

(iii) 24 degrees 39 minutes north latitude, 80 degrees 52 minutes west longitude,

(iv) 24 degrees 30 minutes north latitude, 81 degrees 23 minutes west longitude,

(v) 24 degrees 25 minutes north latitude, 81 degrees 50 minutes west longitude,

(vi) 24 degrees 22 minutes north latitude, 82 degrees 48 minutes west longitude,

(vii) 24 degrees 37 minutes north latitude, 83 degrees 6 minutes west longitude,

(viii) 24 degrees 40 minutes north latitude, 83 degrees 6 minutes west longitude,

(ix) 24 degrees 46 minutes north latitude, 82 degrees 54 minutes west longitude,

(x) 24 degrees 44 minutes north latitude, 81 degrees 55 minutes west longitude,

(xi) 24 degrees 51 minutes north latitude, 81 degrees 26 minutes west longitude, and

(xii) 24 degrees 55 minutes north latitude, 80 degrees 56 minutes west longitude;

(d) then follows the boundary of Everglades National Park in a southerly then northeasterly direction through Florida Bay, Buttonwood Sound, Tarpon Basin, and Blackwater Sound;

(e) after Division Point, then departs from the boundary of Everglades National Park and follows the western shoreline of Manatee Bay, Barnes Sound, and Card Sound;

(f) then follows the southern boundary of Biscayne National Park to the southeasternmost point of Biscayne National Park; and

(g) then follows the eastern boundary of Biscayne National Park to the beginning point specified in paragraph (a).

#### **Appendix II to Part 922, Subpart P—Existing Management Areas boundary coordinates**

The Existing Management Areas are located within the following geographic boundary coordinates:

National Oceanic and Atmospheric Administration, Preexisting National Marine Sanctuaries:

Key Largo Management Area (Key Largo National Marine Sanctuary):

Point	Latitude	Longitude
1.....	25°19.45'N	80°12.00'W
2.....	25°16.02'N	80°08.07'W
3.....	25°07.05'N	80°12.05'W
4.....	24°58.03'N	80°19.08'W
5.....	25°02.02'N	80°25.25'W

Looe Key Management Area (Looe Key National Marine Sanctuary):

Point	Latitude	Longitude
1.....	24°31.37'N	81°26.00'W
2.....	24°33.34'N	81°26.00'W
3.....	24°34.09'N	81°23.00'W
4.....	24°32.12'N	81°23.00'W

United States Fish and Wildlife Service:

Great White Heron National Wildlife Refuge  
(based on the North American Datum of 1983)

Point	Latitude	Longitude
1.....	24°43.8'N	81°48.6'W
2.....	24°43.8'N	81°37.2'W
3.....	24°49.2'N	81°37.2'W
4.....	24°49.2'N	81°19.8'W
5.....	24°48.0'N	81°19.8'W
6.....	24°48.0'N	81°14.4'W
7.....	24°49.2'N	81°14.4'W
8.....	24°49.2'N	81°08.4'W
9.....	24°43.8'N	81°08.4'W
10.....	24°43.8'N	81°14.4'W
11.....	24°43.2'N	81°14.4'W
12.....	24°43.2'N	81°16.2'W
13.....	24°42.6'N	81°16.2'W
14.....	24°42.6'N	81°21.0'W
15.....	24°41.4'N	81°21.0'W
16.....	24°41.4'N	81°22.2'W
17.....	24°43.2'N	81°22.2'W
18.....	24°43.2'N	81°22.8'W
19.....	24°43.8'N	81°22.8'W
20.....	24°43.8'N	81°24.0'W
21.....	24°43.2'N	81°24.0'W
22.....	24°43.2'N	81°26.4'W
23.....	24°43.8'N	81°26.4'W
24.....	24°43.8'N	81°27.0'W
25.....	24°43.2'N	81°27.0'W
26.....	24°43.2'N	81°29.4'W
27.....	24°42.6'N	81°29.4'W
28.....	24°42.6'N	81°30.6'W
29.....	24°41.4'N	81°30.6'W
30.....	24°41.4'N	81°31.2'W
31.....	24°40.8'N	81°31.2'W
32.....	24°40.8'N	81°32.4'W
33.....	24°41.4'N	81°32.4'W
34.....	24°41.4'N	81°34.2'W
35.....	24°40.8'N	81°34.2'W
36.....	24°48.0'N	81°35.4'W
37.....	24°39.6'N	81°35.4'W
38.....	24°39.6'N	81°36.0'W
39.....	24°39.0'N	81°36.0'W
40.....	24°39.0'N	81°37.2'W
41.....	24°37.8'N	81°37.2'W
42.....	24°37.8'N	81°37.8'W
43.....	24°37.2'N	81°37.8'W
44.....	24°37.2'N	81°40.2'W
45.....	24°36.0'N	81°40.2'W
46.....	24°36.0'N	81°40.8'W
47.....	24°35.4'N	81°40.8'W
48.....	24°35.4'N	81°42.0'W
49.....	24°36.0'N	81°42.0'W
50.....	24°36.0'N	81°48.6'W

*Action Plans: Regulatory*

Key West National Wildlife Refuge			East Harbor Key	No-access buffer zone (300 feet) around northernmost island
Point	Latitude	Longitude		
1.....	24°40'N	81°49'W	Lower Harbor Keys	Idle speed only/no-wake zones in selected tidal creeks
2.....	24°40'N	82°10'W		
3.....	24°27'N	82°10'W	Eastern Lake Surprise	Idle speed only/no-wake zone east of highway U.S. 1
4.....	24°27'N	81°49'W	Horseshoe Key	No-access buffer zone (300 feet) around main island (main island closed by Department of Interior)
When differential Global Positioning Systems data becomes available, these coordinates may be revised by Federal Register notice to reflect the increased accuracy of such data.				
<b>Appendix III to Part 922, Subpart P—Wildlife Management Areas access restrictions</b>			Marquesas Keys	(i) No-motor zones (300 feet) around three smallest keys on western side of chain; (ii) no-access buffer zone (300 feet) around one island at western side of chain; (iii) idle speed only/no-wake zone in south west tidal creek
<u>Area</u>	<u>Access Restrictions</u>			
Bay Keys	No-motor zone (300 feet) around one key; idle speed only/no-wake zones in tidal creeks			
Boca Grande Key	South one-half of beach closed (beach above mean high water closed by Department of Interior)		Tidal flat south of Marvin Key	No-access buffer zone on tidal flat
Woman Key	One-half of beach and sand spit on southeast side closed (beach and sand spit above mean high water closed by Department of Interior)		Mud Keys	(i) Idle speed only/no-wake zones in the two main tidal creeks; (ii) two smaller creeks on west side closed
Cayo Agua Keys	Idle speed only/no-wake zones in all navigable tidal creeks		Pelican Shoal	No-access buffer zone out to 50 meters from shore between April 1 and August 31 (shoal closed by the Florida Game and Freshwater Fish Commission)
Cotton Key	No-motor zone on tidal flat		Rodriguez Key	No-motor zone on tidal flats
Snake Creek	No-motor zone on tidal flat		Dove Key	No-motor zone on tidal flats; area around the two small islands closed
Cottrell Key	No-motor zone (300 feet) around entire key		Tavernier Key	No-motor zone on tidal flats
Little Mullet Key	No-access buffer zone (300 feet) around entire key		Sawyer Keys	Tidal creeks on south side closed
Big Mullet Key	No-motor zone (300 feet) around entire key		Snipe Keys	(i) Idle speed only/no-wake zone in main tidal creek; (ii) no-motor zone in all other tidal creeks
Crocodile Lake	No-access buffer zone (100 feet) along shoreline between March 1 and October 1			

Upper Harbor Key No-access buffer zone (300 feet) around entire key

East Content Keys Idle speed only/no-wake zones in tidal creeks between southwesternmost keys

West Content Keys Idle speed only/no-wake zones in selected tidal creeks; no-access buffer zone in one cove

Little Crane Key No-access buffer zone (300 feet) around entire key

#### Appendix IV to Part 922, Subpart P—Ecological Reserves boundary coordinates

One Ecological Reserve—the Western Sambos Ecological Reserve—is designated in the area of Western Sambos reef. NOAA has committed to designating a second Ecological Reserve within two years from issuance of this plan in the area of the Dry Tortugas. The establishment of a Dry Tortugas Ecological Reserve will be proposed by a notice of proposed rulemaking with a proposed boundary determined through a joint effort among the Sanctuary, and the National Park Service, pursuant to a public process involving a team consisting of managers, scientists, conservationists, and affected user groups.

The Western Sambos Ecological Reserve (based on North American Datum of 1983, aerial photos, charts, and Geographic Information Systems data) is located within the following geographic boundary coordinates:

#### WESTERN SAMBOS

Point	Latitude	Longitude
1.....	24°33.70'N	81°40.80'W
2.....	24°28.70'N	81°41.90'W
3.....	24°28.50'N	81°43.70'W
4.....	24°33.50'N	81°43.10'W

When differential Global Positioning Systems data becomes available, these coordinates may be revised by Federal Register notice to reflect the increased accuracy of such data.

#### Appendix V to Part 922, Subpart P—Sanctuary Preservation Areas boundary coordinates

The Sanctuary Preservation Areas (SPAs) (based on North American Datum of 1983, aerial photos, charts, and Geographic Information Systems data) are located within the following geographic boundary coordinates:

#### ALLIGATOR REEF

Point	Latitude	Longitude
1.....	24°50.8'N	80°36.8'W
2.....	24°50.4'N	80°37.3'W
3.....	24°50.7'N	80°37.6'W
4.....	24°51.1'N	80°37.5'W

Catch and release fishing by trolling only is allowed in this SPA.

#### CARYSFORT/SOUTH CARYSFORT REEF

Point	Latitude	Longitude
1.....	25°13.6'N	80°12.2'W
2.....	25°11.9'N	80°12.8'W
3.....	25°12.2'N	80°13.8'W
4.....	25°14.0'N	80°12.7'W

#### CHEECA ROCKS

Point	Latitude	Longitude
1.....	24°54.6'N	80°37.6'W
2.....	24°54.3'N	80°37.5'W
3.....	24°54.2'N	80°37.7'W
4.....	24°54.5'N	80°37.8'W

#### COFFINS PATCH

Point	Latitude	Longitude
1.....	24°41.5'N	80°57.7'W
2.....	24°41.1'N	80°57.5'W
3.....	24°40.6'N	80°58.4'W
4.....	24°41.1'N	80°58.6'W

#### CONCH REEF

Point	Latitude	Longitude
1.....	24°57.5'N	80°27.4'W
2.....	24°57.4'N	80°27.3'W
3.....	24°57.0'N	80°27.7'W
4.....	24°56.9'N	80°27.6'W

Catch and release fishing by trolling only is allowed in this SPA.

## HEN AND CHICKENS

Point	Latitude	Longitude	Point	Latitude	Longitude
DAVIS REEF			1.....	24°56.4'N	80°32.9'W
1.....	24°55.6'N	80°30.3'W	2.....	24°56.2'N	80°32.7'W
2.....	24°55.3'N	80°30.0'W	3.....	24°55.7'N	80°33.1'W
3.....	24°55.1'N	80°30.4'W	4.....	24°55.9'N	80°33.3'W
4.....	24°55.4'N	80°30.7'W	LOOE KEY		

Point	Latitude	Longitude	Point	Latitude	Longitude
DRY ROCKS			1.....	24°33.2'N	81°24.2'W
1.....	25°7.6'N	80°17.9'W	2.....	24°32.6'N	81°24.8'W
2.....	25°7.4'N	80°17.7'W	3.....	24°32.5'N	81°24.7'W
3.....	25°7.3'N	80°17.8'W	4.....	24°33.1'N	81°24.8'W
4.....	25°7.4'N	80°18.1'W	MOLASSES REEF		

Point	Latitude	Longitude	Point	Latitude	Longitude
GRECIAN ROCKS			1.....	25°0.9'N	80°22.4'W
1.....	25°6.9'N	80°18.2'W	2.....	25°0.7'N	80°22.0'W
2.....	25°6.6'N	80°17.9'W	3.....	25°0.2'N	80°22.8'W
3.....	25°6.1'N	80°18.5'W	4.....	25°0.7'N	80°22.8'W
4.....	25°6.2'N	80°18.6'W	NEWFOUND HARBOR KEY		
5.....	25°6.8'N	80°18.6'W	Point	Latitude	Longitude

Point	Latitude	Longitude	1.....	24°37.1'N	81°23.3'W
EASTERN DRY ROCKS			2.....	24°36.7'N	81°23.8'W
1.....	24°27.9'N	81°50.5'W	3.....	24°36.8'N	81°23.3'W
2.....	24°27.7'N	81°50.4'W	4.....	24°36.9'N	81°23.9'W
3.....	24°27.5'N	81°50.6'W	ROCK KEY		
4.....	24°27.7'N	81°50.8'W	Point	Latitude	Longitude

Point	Latitude	Longitude	1.....	24°27.5'N	81°51.3'W
THE ELBOW			2.....	24°27.3'N	81°51.2'W
1.....	25°9.1'N	80°15.4'W	3.....	24°27.2'N	81°51.5'W
2.....	25°8.9'N	80°15.1'W	4.....	24°27.5'N	81°51.6'W
3.....	25°8.1'N	80°15.7'W	SAND KEY		
4.....	25°8.8'N	80°15.7'W	Point	Latitude	Longitude

Point	Latitude	Longitude	1.....	24°27.6'N	81°53.1'W
FRENCH REEF			2.....	24°27.0'N	81°53.1'W
1.....	25°2.2'N	80°20.6'W	3.....	24°27.0'N	81°52.3'W
2.....	25°1.8'N	80°21.0'W	4.....	24°27.6'N	81°52.3'W
3.....	25°2.3'N	80°21.2'W	Catch and release fishing by trolling only is allowed in this SPA.		

**SOMBRERO KEY**

Point	Latitude	Longitude
1.....	24°37.9'N	81°6.8'W
2.....	24°37.4'N	81°6.1'W
3.....	24°37.2'N	81°7.0'W

Catch and release fishing by trolling only is allowed in this SPA.

When differential Global Positioning Systems data becomes available, the coordinates for all these areas may be revised by Federal Register notice to reflect the increased accuracy of such data.

**Appendix VI to Part 922, Subpart P—Special-use Areas boundary coordinates and use designations**

The Special-use Areas (based on North American Datum of 1983) are located within the following geographic boundary coordinates:

**CONCH REEF (RESEARCH ONLY)**

Point	Latitude	Longitude
1.....	24°56.8'N	80°27.2'W
2.....	24°57.0'N	80°27.0'W
3.....	24°57.2'N	80°27.5'W
4.....	24°57.5'N	80°27.4'W

**EASTERN SAMBOS (RESEARCH ONLY)**

Point	Latitude	Longitude
1.....	24°29.4'N	81°39.3'W
2.....	24°29.7'N	81°40.2'W
3.....	24°29.5'N	81°39.6'W
4.....	24°29.8'N	81°39.7'W

**LOOE KEY (RESEARCH ONLY)**

Point	Latitude	Longitude
1.....	24°34.1'N	81°23.3'W
2.....	24°34.0'N	81°23.2'W
3.....	24°33.8'N	81°23.8'W
4.....	24°34.0'N	81°23.9'W

**TENNESSEE REEF (RESEARCH ONLY)**

Point	Latitude	Longitude
1.....	24°45.9'N	80°45.6'W

2.....	24°45.7'N	80°45.4'W
3.....	24°46.0'N	80°44.9'W
4.....	24°46.2'N	80°45.1'W

**Appendix VII to Part 922, Subpart P—Areas To Be Avoided boundary coordinates**

**IN THE VICINITY OF THE FLORIDA KEYS**

(Reference Charts: United States 11466, 27th Edition

September 1, 1990 and United States 11450, 4th Edition -August 11, 1990.)

Point	Latitude	Longitude
1.....	25°45.00'N	80°06.10'W
2.....	25°38.70'N	80°02.70'W
3.....	25°22.00'N	80°03.00'W
4.....	25°00.20'N	80°13.40'W
5.....	24°37.90'N	80°47.30'W
6.....	24°29.20'N	81°17.30'W
7.....	24°22.30'N	81°43.17'W
8.....	24°28.00'N	81°43.17'W
9.....	24°28.70'N	81°43.50'W
10.....	24°29.80'N	81°43.17'W
11.....	24°33.10'N	81°35.15'W
12.....	24°33.60'N	81°26.00'W
13.....	24°38.20'N	81°07.00'W
14.....	24°43.20'N	80°53.20'W
15.....	24°46.10'N	80°46.15'W
16.....	24°51.10'N	80°37.10'W
17.....	24°57.50'N	80°27.50'W
18.....	25°09.90'N	80°16.20'W
19.....	25°24.00'N	80°09.10'W
20.....	25°31.50'N	80°07.00'W
21.....	25°39.70'N	80°06.85'W
22.....	25°45.00'N	80°06.10'W

**IN THE VICINITY OF KEY WEST HARBOR**

(Reference Chart: United States 11434, 21st Edition - August 11, 1990.)

Point	Latitude	Longitude
23.....	24°27.95'N	81°48.65'W
24.....	24°23.00'N	81°53.50'W
25.....	24°26.60'N	81°58.50'W
26.....	24°27.75'N	81°55.70'W
27.....	24°29.35'N	81°53.40'W
28.....	24°29.35'N	81°50.00'W
29.....	24°27.95'N	81°48.65'W

AREA SURROUNDING THE  
MARQUESAS KEYS

(Reference Chart: United States 11434, 21st Edition -  
August 11, 1990.)

Point	Latitude	Longitude
30.....	24°26.60'N	81°59.55'W
31.....	24°23.00'N	82°03.50'W
32.....	24°23.60'N	82°27.80'W
33.....	24°34.50'N	82°37.50'W
34.....	24°43.00'N	82°26.50'W
35.....	24°38.31'N	81°54.06'W
36.....	24°37.91'N	81°53.40'W
37.....	24°36.15'N	81°51.78'W
38.....	24°34.40'N	81°50.60'W
39.....	24°33.44'N	81°49.73'W
40.....	24°31.20'N	81°52.10'W
41.....	24°28.70'N	81°56.80'W
42.....	24°26.60'N	81°59.55'W

AREA SURROUNDING THE  
DRY TORTUGAS ISLANDS

(Reference Chart: United States 11434, 21st Edition -  
August 11, 1990.)

Point	Latitude	Longitude
43.....	24°32.00'N	82°53.50'W
44.....	24°32.00'N	83°00.05'W
45.....	24°39.70'N	83°00.05'W
46.....	24°45.60'N	82°54.40'W
47.....	24°45.60'N	82°47.20'W
48.....	24°42.80'N	82°43.90'W
49.....	24°39.50'N	82°43.90'W
50.....	24°35.60'N	82°46.40'W
51.....	24°32.00'N	82°53.50'W

**Appendix VIII to Part 929-Marine Life Rule** [as  
excerpted from Chapter 46-42 of the Florida Adminis-  
trative Code]

46-42.001 Purpose and Intent; Designation of  
Restricted Species; Definition of "Marine Life Spe-  
cies."

46-42.002 Definitions.

46-42.003 Prohibition of Harvest: Longspine Urchin,  
Bahama Starfish.

46-42.0035 Live Landing and Live Well Require-  
ments.

46-42.0036 Harvest in Biscayne National Park.\*

46-42.004 Size Limits.

46-42.005 Bag Limits.

46-42.006 Commercial Season, Harvest Limits.

46-42.007 Gear Specifications and Prohibited Gear.

46-42.008 Live Rock.\*

46-42.009 Prohibition on the Taking, Destruction, or  
Sale of Marine Corals and Sea Fans.

\*- Part 42.0036 was not reproduced because it does  
not apply to the Sanctuary.

\*- Part 42.008 was not reproduced because it is  
regulated pursuant to this Part 922.163(2)(ii).

46-42.001 Purpose and Intent; Designation of  
Restricted Species; Definition of "Marine Life Spe-  
cies".--

(1)(a) The purpose and intent of this chapter are  
to protect and conserve Florida's tropical marine life  
resources and assure the continuing health and  
abundance of these species. The further intent of  
this chapter is to assure that harvesters in this fishery  
use nonlethal methods of harvest and that the fish,  
invertebrates, and plants so harvested be maintained  
alive for the maximum possible conservation and  
economic benefits.

(b) It is the express intent of the Marine Fisher-  
ies Commission that landing of live rock propagated  
through aquaculture will be allowed pursuant to the  
provisions of this chapter.

(2) The following fish species, as they occur in  
waters of the state and in federal Exclusive Economic  
Zone (EEZ) waters adjacent to state waters, are  
hereby designated as restricted species pursuant to  
Section 370.01(20), Florida Statutes:

(a) Moray eels - Any species of the Family  
Muraenidae.

(b) Snake eels - Any species of the Genera  
Myrichthys and Myrophis of the Family Ophichthidae.

(c) Toadfish - Any species of the Family  
Batrachoididae.

(d) Frogfish - Any species of the Family  
Antennariidae.

(e) Batfish - Any species of the Family Ogcocephalidae.

(f) Clingfish - Any species of the Family Gobiesocidae.

(g) Trumpetfish - Any species of the Family Aulostomidae.

(h) Cornetfish - Any species of the Family Fistulariidae.

(i) Pipefish/seahorses - Any species of the Family Syngnathidae.

(j) Hamlet/seabass - Any species of the Family Serranidae, except groupers of the genera *Epinephalus* and *Mycteroperca*, and seabass of the genus *Centropristis*.

(k) Basslets - Any species of the Family Grammistidae.

(l) Cardinalfish - Any species of the Family Apogonidae.

(m) High-hat, Jackknife-fish, Spotted drum, Cubbyu - Any species of the genus *Equetus* of the Family Sciaenidae.

(n) Reef Croakers - Any of the species *Odontocion dentex*.

(o) Sweepers - Any species of the Family Pempheridae.

(p) Butterflyfish - Any species of the Family Chaetodontidae.

(q) Angelfish - Any species of the Family Pomacanthidae.

(r) Damselfish - Any species of the Family Pomacentridae.

(s) Hawkfish - Any species of the Family Cirrhitidae.

(t) Wrasse/hogfish/razorfish - Any species of the Family Labridae, except hogfish, *Lachnolaimus maximus*.

(u) Parrotfish - Any species of the Family Scaridae.

(v) Jawfish - Any species of the Family Opistognathidae.

(w) Blennies - Any species of the Families Clinidae or Blenniidae.

(x) Sleepers - Any species of the Family Eleotrididae.

(y) Gobies - Any species of the Family Gobiidae.

(z) Tangs and surgeonfish - Any species of the Family Acanthuridae.

(aa) Filefish/triggerfish - Any species of the Family Balistes, except gray triggerfish, *Balistidae capricus*.

(bb) Trunkfish/cowfish - Any species of the Family Ostraciidae.

(cc) Pufferfish/burrfish/balloonfish - Any of the following species:

1. Balloonfish - *Diodon holocanthus*.
2. Sharpnose puffer - *Canthigaster rostrata*.
3. Striped burrfish - *Chilomycterus schoepfi*.

(3) The following invertebrate species, as they occur in waters of the state and in federal Exclusive Economic Zone (EEZ) waters adjacent to state waters, are hereby designated as restricted species pursuant to Section 370.01(20), Florida Statutes:

(a) Sponges - Any species of the Class Demospongia, except sheepswool, yellow, grass, glove, finger, wire, reef, and velvet sponges, Order Dictyoceratida.

(b) Upside-down jellyfish - Any species of the Genus *Cassiopeia*.

(c) Siphonophores/hydroids - Any species of the Class Hydrozoa, except fire corals, Order Milleporina.

(d) Soft corals - Any species of the Subclass Octocorallia, except sea fans *Gorgonia flabellum* and *Gorgonia ventalina*.

(e) Sea anemones - Any species of the Orders Actinaria, Zoanthidea, Corallimorpharia, and Ceriantharia.

(f) Featherduster worms/calcareous tubeworms - Any species of the Families Sabellidae and Serpulidae.



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(g) Star-shells - Any of the species *Astraea americana* or *Astraea phoebia*.

(h) Nudibranchs/sea slugs - Any species of the Subclass Opisthobranchia.

(i) Fileclams - Any species of the Genus *Lima*.

(j) Octopods - Any species of the Order Octopoda, except the common octopus, *Octopus vulgaris*.

(k) Shrimp - Any of the following species:

1. Cleaner shrimp and peppermint shrimp - Any species of the Genera *Periclimenes* or *Lysmata*.

2. Coral shrimp - Any species of the Genus *Stenopus*.

3. Snapping shrimp - Any species of the Genus *Alpheus*.

(l) Crabs - Any of the following species:

1. Yellowline arrow crab - *Stenorhynchus seticornis*.

2. Furcate spider or decorator crab - *Stenocionops furcata*.

3. Thinstripe hermit crab - *Clibanarius vittatus*.

4. Polkadotted hermit crab - *Phimochirus operculatus*.

5. Spotted porcelain crab - *Porcellana sayana*.

6. Nimble spray or urchin crab - *Percnon gibbesi*.

7. False arrow crab - *Metoporphaphis calcarata*.

(m) Starfish - Any species of the Class Asteroidea, except the Bahama starfish, *Oreaster reticulatus*.

(n) Brittlestars - Any species of the Class Ophiuroidea.

(o) Sea urchins - Any species of the Class Echinoidea, except longspine urchin, *Diadema antillarum*, and sand dollars and sea biscuits, Order Clypeasteroidea.

(p) Sea cucumbers - Any species of the Class Holothuroidea.

(q) Sea lillies - Any species of the Class Crinoidea.

(4) The following species of plants, as they occur in waters of the state and in federal Exclusive Economic Zone (EEZ) waters adjacent to state waters, are hereby designated as restricted species pursuant to Section 370.01(20), Florida Statutes:

(a) *Caulerpa* - Any species of the Family Caulerpaceae.

(b) *Halimeda*/mermaid's fan/mermaid's shaving brush - Any species of the Family Halimedaceae.

(c) Coralline red algae - Any species of the Family Corallinaceae.

(5) For the purposes of Section 370.06(2)(d), Florida Statutes, the term "marine life species" is defined to mean those species designated as restricted species in subsections (2), (3), and (4) of this rule.

Specific Authority 370.01(20), 370.027(2), 370.06(2)(d), F.S. Law Implemented 370.01(20), 370.025, 370.027, 370.06(2)(d), F.S. History -- New 1-1-91, Amended 7-1-92, 1-1-95.

46-42.002 Definitions.-- As used in this rule chapter:

(1) "Barrier net," also known as a "fence net," means a seine used beneath the surface of the water by a diver to enclose and concentrate tropical fish and which may be made of either nylon or monofilament.

(2) "Drop net" means a small, usually circular, net with weights attached along the outer edge and a single float in the center, used by a diver to enclose and concentrate tropical fish.

(3) "Hand held net" means a landing or dip net as defined in Rule 46-4.002(4), except that a portion of the bag may be constructed of clear plastic material, rather than mesh.

(4) "Harvest" means the catching or taking of a marine organism by any means whatsoever, followed by a reduction of such organism to possession. Marine organisms that are caught but immediately returned to the water free, alive, and unharmed are not harvested. In addition, temporary possession of a marine animal for the purpose of measuring it to determine compliance with the minimum or maximum size requirements of this chapter shall not constitute

harvesting such animal, provided that it is measured immediately after taking, and immediately returned to the water free, alive, and unharmed if undersize or oversize.

(5) "Harvest for commercial purposes" means the taking or harvesting of any tropical ornamental marine life species or tropical ornamental marine plant for purposes of sale or with intent to sell. The harvest of tropical ornamental marine life species or tropical ornamental marine plants in excess of the bag limit shall constitute prima facie evidence of intent to sell.

(6) "Land," when used in connection with the harvest of marine organisms, means the physical act of bringing the harvested organism ashore.

(7) "Live rock" means rock with living marine organisms attached to it.

(8) "Octocoral" means any erect, nonencrusting species of the Subclass Octocorallia, except the species *Gorgonia flabellum* and *Gorgonia ventalina*.

(9) "Slurp gun" means a self-contained, handheld device that captures tropical fish by rapidly drawing seawater containing such fish into a closed chamber.

(10) "Total length" means the length of a fish as measured from the tip of the snout to the tip of the tail.

(11) "Trawl" means a net in the form of an elongated bag with the mouth kept open by various means and fished by being towed or dragged on the bottom.

"Roller frame trawl" means a trawl with all of the following features and specifications:

(a) A rectangular rigid frame to keep the mouth of the trawl open while being towed.

(b) The lower horizontal beam of the frame has rollers to allow the trawl to roll over the bottom and any obstructions while being towed.

(c) The trawl opening is shielded by a grid of vertical bars spaced no more than 3 inches apart.

(d) The trawl is towed by attaching a line or towing cable to a tongue located above or at the center of the upper horizontal beam of the frame.

(e) The trawl has no doors attached to keep the mouth of the trawl open.

(12) "Tropical fish" means any species included in subsection (2) of Rule 46-42.001, or any part thereof.

(13) "Tropical ornamental marine life species" means any species included in subsections (2) or (3) of Rule 46-42.001, or any part thereof.

(14) "Tropical ornamental marine plant" means any species included in subsection (4) of Rule 46-42.001.

Specific Authority 370.027(2), F.S. Law Implemented 370.025, 370.027, F.S. History -- New 1-1-91, Amended 7-1-92, 1-1-95.

46-42.003 Prohibition of Harvest: Longspine Urchin, Bahama Starfish.-- No person shall harvest, possess while in or on the waters of the state, or land any of the following species:

(1) Longspine urchin, *Diadema antillarum*.

(2) Bahama starfish, *Oreaster reticulatus*.

Specific Authority 370.027(2), F.S. Law Implemented 370.025, 370.027, F.S. History -- New 1-1-91, Amended 7-1-92.

46-42.0035 Live Landing and Live Well Requirements.--

(1) Each person harvesting any tropical ornamental marine life species or any tropical ornamental marine plant shall land such marine organism alive.

(2) Each person harvesting any tropical ornamental marine life species or any tropical ornamental marine plant shall have aboard the vessel being used for such harvest a continuously circulating live well or aeration or oxygenation system of adequate size and capacity to maintain such harvested marine organisms in a healthy condition.

Specific Authority 370.027(2), F.S. Law Implemented 370.025, 370.027, F.S. History -- New 7-1-92.

46-42.004 Size Limits.--

(1) Angelfishes.-

(a) No person harvesting for commercial purposes shall harvest, possess while in or on the

waters of the state, or land any of the following species of angelfish, of total length less than that set forth below:

1. One-and-one-half (1 1/2) inches for:

- a. Gray angelfish (*Pomacanthus arcuatus*).
- b. French angelfish (*Pomacanthus paru*).

2. One-and-three-quarters (1 3/4) inches for:

- a. Blue angelfish (*Holacanthus bermudensis*).
- b. Queen angelfish (*Holacanthus ciliaris*).

3. Two (2) inches for rock beauty (*Holacanthus tricolor*).

(b) No person shall harvest, possess while in or on the waters of the state, or land any angelfish (Family Pomacanthidae), of total length greater than that specified below:

1. Eight (8) inches for angelfish, except rock beauty (*Holacanthus tricolor*).

2. Five (5) inches for rock beauty.

(c) Except as provided herein, no person shall purchase, sell, or exchange any angelfish smaller than the limits specified in paragraph (a) or larger than the limits specified in paragraph (b). This prohibition shall not apply to angelfish legally harvested outside of state waters or federal Exclusive Economic Zone (EEZ) waters adjacent to state waters, which angelfish are entering Florida in interstate or international commerce. The burden shall be upon any person possessing such angelfish for sale or exchange to establish the chain of possession from the initial transaction after harvest, by appropriate receipt(s), bill(s) of sale, or bill(s) of lading, and any customs receipts, and to show that such angelfish originated from a point outside the waters of the State of Florida or federal Exclusive Economic Zone (EEZ) waters adjacent to Florida waters and entered the state in interstate or international commerce. Failure to maintain such documentation or to promptly produce same at the request of any duly authorized law enforcement officer shall constitute prima facie evidence that such angelfish were harvested from Florida waters or adjacent EEZ waters for purposes of this paragraph.

(2) Butterflyfishes.--

(a) No person harvesting for commercial purposes shall harvest, possess while in or on the waters of the state, or land any butterflyfish (Family Chaetodontidae) of total length less than one (1) inch.

(b) No person shall harvest, possess while in or on the waters of the state, or land any butterflyfish of total length greater than 4 inches.

(3) Gobies -- No person shall harvest, possess while in or on the waters of the state, or land any gobie (Family Gobiidae) of total length greater than 2 inches.

(4) Jawfishes -- No person shall harvest, possess while in or on the waters of the state, or land any jawfish (Family Opistognathidae) of total length greater than 4 inches.

(5) Spotfin and Spanish hogfish --

(a) No person shall harvest, possess while in or on the waters of this state, or land any Spanish hogfish (*Bodianus rufus*) of total length less than 2 inches.

(b) No person shall harvest, possess while in or on the waters of this state, or land any Spanish hogfish (*Bodianus rufus*) or spotfin hogfish (*Bodianus pulchellus*) of total length greater than 8 inches.

Specific Authority 370.027(2), F.S. Law Implemented 370.025, 370.027, F.S. History -- New 1-1-91, Amended 7-1-92, 1-1-95.

46-42.005 Bag limit.--

(1) Except as provided in Rule 46-42.006 or subsections (3) or (4) of this rule, no person shall harvest, possess while in or on the waters of the state, or land more than 20 individuals per day of tropical ornamental marine life species, in any combination.

(2) Except as provided in Rule 46-42.006, no person shall harvest, possess while in or on the waters of the state, or land more than one (1) gallon per day of tropical ornamental marine plants, in any combination of species.

(3) Except as provided in Rule 46-42.006, no person shall harvest, possess while in or on the waters of the state, or land more than 5 angelfishes (Family Pomacanthidae) per day. Each angelfish

shall be counted for purposes of the 20 individual bag limit specified in subsection (1) of this rule.

(4)(a) Unless the season is closed pursuant to paragraph (b), no person shall harvest, possess while in or on the waters of the state, or land more than 6 colonies per day of octocorals. Each colony of octocoral or part thereof shall be considered an individual of the species for purposes of subsection (1) of this rule and shall be counted for purposes of the 20 individual bag limit specified therein. Each person harvesting any octocoral as authorized by this rule may also harvest substrate within 1 inch of the perimeter of the holdfast at the base of the octocoral, provided that such substrate remains attached to the octocoral.

(b) If the harvest of octocorals in federal Exclusive Economic Zone (EEZ) waters adjacent to state waters is closed to all harvesters prior to September 30 of any year, the season for harvest of octocorals in state waters shall also close until the following October 1, upon notice given by the Secretary of the Department of Environmental Protection, in the manner provided in s.120.52(16)(d), Florida Statutes.

Specific Authority 370.027(2), F.S. Law Implemented 370.025, 370.027, F.S. History -- New 1-1-91, Amended 1-1-95.

**46-42.006 Commercial Season, Harvest Limits.--**

(1) Except as provided in Rule 46-42.008(7), no person shall harvest, possess while in or on the waters of the state, or land quantities of tropical ornamental marine life species or tropical ornamental marine plants in excess of the bag limits established in Rule 46-42.005 unless such person possesses a valid saltwater products license with both a marine life fishery endorsement and a restricted species endorsement issued by the Department of Environmental Protection.

(2) Persons harvesting tropical ornamental marine life species or tropical ornamental marine plants for commercial purposes shall have a season that begins on October 1 of each year and continues through September 30 of the following year. These persons shall not harvest, possess while in or on the waters of the state, or land tropical ornamental marine life species in excess of the following limits:

(a) A limit of 75 angelfish (Family Pomacanthidae) per person per day or 150 angelfish per vessel per day, whichever is less.

(b) A limit of 75 butterflyfishes (Family Chaetodontidae) per vessel per day.

(c) There shall be no limits on the harvest for commercial purposes of octocorals unless and until the season for all harvest of octocorals in federal Exclusive Economic Zone (EEZ) waters adjacent to state waters is closed. At such time, the season for harvest of octocorals in state waters shall also close until the following October 1, upon notice given by the Secretary of the Department of Environmental Protection, in the manner provided in Section 120.52(16)(d), Florida Statutes. Each person harvesting any octocoral as authorized by this rule may also harvest substrate within 1 inch of the perimeter of the holdfast at the base of the octocoral, provided that such substrate remains attached to the octocoral.

(d) A limit of 400 giant Caribbean or "pink-tipped" anemones (Genus Condylactus) per vessel per day.

Specific Authority 370.027(2), F.S. Law Implemented 370.025, 370.027, F.S. History - New 1-1-91, Amended 7-1-92, 1-1-95.

**46-42.007 Gear Specifications and Prohibited Gear.--**

(1) The following types of gear shall be the only types allowed for the harvest of any tropical fish, whether from state waters or from federal Exclusive Economic Zone (EEZ) waters adjacent to state waters:

(a) Hand held net.

(b) Barrier net, with a mesh size not exceeding 3/4 inch stretched mesh.

(c) Drop net, with a mesh size not exceeding 3/4 inch stretched mesh.

(d) Slurp gun.

(e) Quinaldine may be used for the harvest of tropical fish if the person using the chemical or possessing the chemical in or on the waters of the state meets each of the following conditions:

1. The person also possesses and maintains aboard any vessel used in the harvest of tropical fish with quinaldine a special activity license authorizing the use of quinaldine, issued by the Division of Marine Resources of the Department of Environmen-

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tal Protection pursuant to Section 370.08(8), Florida Statutes.

2. The quinaldine possessed or applied while in or on the waters of the state is in a diluted form of no more than 2% concentration in solution with seawater. Prior to dilution in seawater, quinaldine shall only be mixed with isopropyl alcohol or ethanol.

(f) A roller frame trawl operated by a person possessing a valid live bait shrimping license issued by the Department of Environmental Protection pursuant to Section 370.15, Florida Statutes, if such tropical fish are taken as an incidental bycatch of shrimp lawfully harvested with such trawl.

(g) A trawl meeting the following specifications used to collect live specimens of the dwarf seahorse, *Hippocampus zosterae*, if towed by a vessel no greater than 15 feet in length at no greater than idle speed:

1. The trawl opening shall be no larger than 12 inches by 48 inches.

2. The trawl shall weigh no more than 5 pounds wet when weighed out of the water.

(2) This rule shall not be construed to prohibit the use of any bag or container used solely for storing collected specimens or the use of a single blunt rod in conjunction with any allowable gear, which rod meets each of the following specifications:

(a) The rod shall be made of nonferrous metal, fiberglass, or wood.

(b) The rod shall be no longer than 36 inches and have a diameter no greater than 3/4 inch at any point.

(3) No person shall harvest in or from state waters any tropical fish by or with the use of any gear other than those types specified in subsection (1); provided, however, that tropical fish harvested as an incidental bycatch of other species lawfully harvested for commercial purposes with other types of gear shall not be deemed to be harvested in violation of this rule, if the quantity of tropical fish so harvested does not exceed the bag limits established in Rule 46-42.005.

Specific Authority 370.027(2), F.S. Law Implemented 370.025, 370.027, F.S. History -- New 1-1-91, Amended 7-1-92, 1-1-95.

46-42.009 Prohibition on the Taking, Destruction, or Sale of Marine Corals and Sea Fans; Exception; Repeal of Section 370.114, Florida Statutes.--

(1) Except as provided in subsection (2), no person shall take, attempt to take, or otherwise destroy, or sell, or attempt to sell, any sea fan of the species *Gorgonia flabellum* or of the species *Gorgonia ventalina*, or any hard or stony coral (Order Scleractinia) or any fire coral (Genus *Millepora*). No person shall possess any such fresh, uncleaned, or uncured sea fan, hard or stony coral, or fire coral.

(2) Subsection (1) shall not apply to:

(a) Any sea fan, hard or stony coral, or fire coral legally harvested outside of state waters or federal Exclusive Economic Zone (EEZ) waters adjacent to state waters and entering Florida in interstate or international commerce. The burden shall be upon any person possessing such species to establish the chain of possession from the initial transaction after harvest, by appropriate receipt(s), bill(s) of sale, or bill(s) of lading, and any customs receipts, and to show that such species originated from a point outside the waters of the State of Florida or federal Exclusive Economic Zone (EEZ) adjacent to state waters and entered the state in interstate or international commerce. Failure to maintain such documentation or to promptly produce same at the request of any duly authorized law enforcement officer shall constitute prima facie evidence that such species were harvested from Florida waters in violation of this rule.

(b) Any sea fan, hard or stony coral, or fire coral harvested and possessed pursuant to permit issued by the Department of Environmental Protection for scientific or educational purposes as authorized in Section 370.10(2), Florida Statutes.

(c) Any sea fan, hard or stony coral, or fire coral harvested and possessed pursuant to the aquacultured live rock provisions of Rule 46-42.008(3)(a) or pursuant to a Live Rock Aquaculture Permit issued by the National Marine Fisheries Service under 50 C.F.R. Part 638 and meeting the following requirements:

1. Persons possessing these species in or on the waters of the state shall also possess a state submerged lands lease for live rock aquaculture and a Department of Environmental Protection permit for live rock culture deposition and removal or a federal Live Rock Aquaculture Permit. If the person possessing these species is not the person named in the

documents required herein, then the person in such possession shall also possess written permission from the person so named to transport aquacultured live rock pursuant to this exception.

2. The nearest office of the Florida Marine Patrol shall be notified at least 24 hours in advance of any transport in or on state waters of aquacultured live rock pursuant to this exception.

3. Persons possessing these species off the water shall maintain and produce upon the request of any duly authorized law enforcement officer sufficient documentation to establish the chain of possession from harvest on a state submerged land lease for live rock aquaculture or in adjacent Exclusive Economic Zone (EEZ) waters pursuant to a federal Live Rock Aquaculture Permit.

4. Any sea fan, hard or stony coral, or fire coral harvested pursuant to Rule 46-42.008(3)(a) shall remain attached to the cultured rock.

Specific Authority 370.027(2), F.S.; Section 6, Chapter 83-134, Laws of Florida, as amended by Chapter 84-121, Laws of Florida. Law Implemented 370.025, 370.027, F.S.; Section 6, Chapter 83-134, Laws of Florida, as amended by Chapter 84-121, Laws of Florida. History - New 1-1-95.2222

# Research and Monitoring Action Plan

***This action plan identifies and describes research and monitoring strategies that will be implemented for the Florida Keys National Marine Sanctuary. The strategies within the plan are derived from Alternative III, the most balanced of the management alternatives. For each strategy, the time required for implementation, funding availability, costs, and responsible parties are outlined. Although this is the final set of research and monitoring strategies, only a subset will be implemented in the first year of Sanctuary operation. These strategies are expected to have a significant impact on Sanctuary resources. Table 17 summarizes key information about the implementation of research and monitoring strategies.***

## Introduction

Research and monitoring are critical to achieving the Sanctuary's primary goal of resource protection. The Keys' ecosystem is diverse and complex, and many of its processes and their interrelationships are not well known. Also, while many resource impacts are obvious and severe, they are often not documented or quantified, and their causes may be even less clear or completely unknown. The purpose of research and monitoring is to establish a baseline of information on the resource and the various components of the ecosystem, and how they interact. In this way, research and monitoring can ensure the effective implementation of management strategies using the best available scientific information.

Research and monitoring activities must focus on fundamental processes and specific management-driven topics. Information generated from such activities will be used to:

- provide the public with a means to evaluate the effectiveness of the Sanctuary;
- provide a means to distinguish between the effects of human activities and natural variability;
- develop hypotheses about causal relationships which can then be investigated;
- evaluate management actions; and
- verify and validate quantitative predictive models used to evaluate and select management actions.

Two laws require that a research and monitoring program be implemented within the Sanctuary. Section 309 of the NMSA mandates that the "Secretary of Commerce shall take such action as is necessary and reasonable to promote and coordinate the use of national marine sanctuaries for research, monitoring, and education purposes." The 1992 amendments to the FKNMSPA (Section 7(a)(4)) are much more specific, calling on the Secretary of Commerce to:

- identify priority needs for research and amounts needed to improve management of the Sanctuary, and in particular, the coral reef ecosystem within the Sanctuary;
- identify clearly the cause-and-effect relationships between factors threatening the health of the coral reef ecosystem in the Sanctuary; and
- establish a long-term ecological monitoring program and database, including methods to disseminate information on the management of the coral reef ecosystem.

***How the Plan is Organized.*** This action plan is organized into three sections: an introduction, description of strategies, and implementation. The introduction summarizes the goals and objectives of the Research and Monitoring Program, and provides background information on planning efforts. The strategy description section organizes strategies into several groups, including: 1) research management; 2) monitoring; 3) fisheries impacts; 4) environmental assessment; and 5) predictive strategies. The implementation section details how strategies in the plan will be placed into action. For each strategy and component activity, the priority level, funding availability, costs, and timing of implementation are summarized.

## Background

It has long been recognized that research efforts in the Keys must be focused on priority issues, and various workshops have been held to define those issues. In October 1991, NOAA's Sanctuaries and Reserves Division sponsored a workshop where over 90 environmental managers and scientists presented their views and developed a list of priorities and objectives for managing a successful research program (Harwell, 1991). NOAA had previously

(1988) funded the Marine Resources Development Foundation to sponsor a workshop to discuss management, education, and research issues, and to develop priority action plans (Miller, 1988). Other pertinent planning efforts include the five-year research plan of the Florida Marine Research Institute (FMRI) (FDNR, 1989); the Florida Keys Environmental Summit Report (Olson, 1991), an international workshop on coral reefs and their response to global climate change (D'Elia et al., 1991), EPA's Water Quality Protection Program Plan for the Florida Keys National Marine Sanctuary, and the management plans for the Key Largo and Looe Key National Marine Sanctuaries. The Sanctuary will enable improvements in the funding, focus, and quality of research, and the free exchange and discussion of research information. It will influence research by establishing priorities, encouraging open communication among researchers and managers, and allowing Sanctuary staff to work closely with researchers to accomplish mutual goals.

Both research and monitoring activities are in this plan because they employ similar methods, are often conducted by the same people and agencies, and must be linked to one another. Research is goal-oriented with well-defined, testable hypotheses, and is of finite duration. Monitoring involves systematic long-term data collection and analysis to measure the state of the resource and detect changes over time. Detecting such changes can prompt management decisions, can be used to evaluate the success of management strategies, or to focus research on determining the reason for the change.

**Management Strategies** Each strategy has been assigned an estimated activity level for year 1 (high, medium, low, or none). This activity level is an estimation of the planned level of action that will occur in the first year after the Sanctuary Management Plan is adopted. In addition, the time required, costs of implementation, and funding availability (Federal, State, local, and private) have been esti-

Table 17. Summary of Research and Monitoring Strategies

Page	Strategies	Overall Sanctuary Priority Level +	Planned Level of Action in Year 1	Months to Complete	Funding for Full Implemen- tation	Number of Activities to be Undertaken	Number of Institutions
149 Research Management							
149 B 11	National Marine Sanctuary Permits	*	High	<12	100%	1	5
150 W.28	Regional Database	High		Refer to Water Quality Action Plan			
150 W.29	Dissemination of Findings	Medium		Refer to Water Quality Action Plan			
150 W.32	Technical Advisory Committee	*		Refer to Water Quality Action Plan			
150 Monitoring							
151 F 6	Fisheries Sampling	High	High	36+	<50%	2	7
152 W 20	Monitoring	High		Refer to Water Quality Action Plan			
152 W 33	Ecological Monitoring	High	Medium	60+	<50%	7	8
155 Z.2	Ecological Reserves	High	Medium	36+	<50%	4	4
156 Z.3	Sanctuary Preservation Areas	High	Medium	36+	<50%	4	4
157 Z 5	Special-use Areas	High	Medium	36+	<50%	4	5
158 Fisheries Impacts							
158 F 3	Stocking	Low	None	36	None	1	9
159 F 4	Aquaculture Alternatives	Low	None	36+	<50%	1	8
159 F 7	Artificial Reefs	Low	None	48+	<50%	1	7
159 F.10	Bycatch	Low	None	48+	<25%	1	7
160 F.11	Gear/Method Impacts	Low	None	48+	<25%	1	7
160 F 14	Spearfishing	Low	None	36	0%	2	5
161 F.15	Sponge Harvest	Medium	Medium	36	<75%	1	8
161 Special Studies							
161 B 2	Habitat Restoration	Medium	Medium	24+	50-74%	2	8
162 R 5	Carrying Capacity	Medium	Low	48+	<50%	1	9
162 W.5	Water Quality Standards	Medium		Refer to Water Quality Action Plan			
163 W.18	Pesticide Research	High		Refer to Water Quality Action Plan			
163 W.24	Florida Bay Influence	High		Refer to Water Quality Action Plan			
163 Predictive Strategies							
163 W 21	Predictive Models	High		Refer to Water Quality Action Plan			

\* Strategies with an "\*" for Overall Sanctuary Priority Level are already existing programs and/or will be completed in the first year of sanctuary operation.



## Existing Research and Monitoring Programs

**Research** Much research has been done in the Florida Keys, and a synopsis of this work can be found in the Description of the Affected Environment chapter of this Management Plan and in the Site Characterization for the Sanctuary, 1996. Research is conducted by many groups, including local, State, and Federal agencies, public and private universities; private research foundations, environmental organizations; and independent researchers. While productive, research efforts are driven by diverse goals, vary in available resources and quality, and do not effectively share results. Leading research groups include:

- NOAA's on-site National Marine Sanctuary Program and National Marine Fisheries Service (NMFS) staff;
- NOAA's on-site National Undersea Research Center (NURC) at the University of North Carolina-Wilmington. Since 1991, NURC's Florida program has been a major sponsor of undersea research in the Sanctuary. Using the Aquarius undersea laboratory and surface boats, scientists conduct research in the following areas: reef health, reef development, water quality, fisheries, and ecology
- The U.S. Geological Service's Center for Coastal Geology maps and conducts geological research on coral reefs in the Florida Keys;
- The Florida Department of Environmental Protection (FDEP), Florida Marine Research Institute (FMRI) (St. Petersburg and Long Key laboratories);
- The University of Miami's Rosenstiel School for Marine and Atmospheric Sciences;
- The State university system coordinated through the Florida Institute of Oceanography (FIO). The most active universities are the University of Florida, the University of South Florida, and Florida International University. FIO collaborates with the FDEP in running the Long Key Lab

**Monitoring** A number of monitoring activities are occurring in or near the Keys. The most comprehensive, long-term monitoring program underway in the Keys is conducted through the Water Quality Protection Program (WQPP) funded by USEPA. The

WQPP monitoring program began in 1994 and consists of three components: water quality, corals/hardbottoms, and seagrasses. The following are some of the monitoring efforts that are occurring in this area:

**Corals.** Coral population dynamics are being monitored at 42 fixed stations throughout the Keys as part of the WQPP. Historical monitoring has been done throughout the Keys by the NMFS, FDEP, SEAKEYS, and the College of Charleston

**Fish.** The NMFS and the FDEP monitor recreational and commercial catch statistics concerning commercially important species. NMFS' Reef Resources Team has been gathering baseline data on reef fish populations in and around the no-take zones since 1993.

**Seagrass.** Seagrass dynamics are being monitored at 51 sites throughout the Sanctuary as part of the WQPP. The National Park Service (NPS) and the University of Virginia monitor seagrass productivity in Everglades National Park.

**Mangroves.** The NPS in Everglades National Park is evaluating the effects of sea level rise on mangroves.

**Benthic Organisms.** NOAA, Biscayne National Park, and the FDEP are monitoring organisms such as spiny lobster, sponge, conch, stone crabs, and *Diadema*. NOAA's National Status and Trends Program monitors one mollusc in the Upper Keys for toxic contamination.

**Hardbottom Communities.** The Nature Conservancy's (TNC) Florida and Caribbean Marine Conservation Science Center has been monitoring hardbottom communities since 1981

**Algal Blooms.** TNC and the FDEP have been monitoring and mapping algal blooms in Florida Bay and the Sanctuary

**Physical parameters.** FIO's SEAKEYS program has been operating six automated, instrumented monitoring stations placed strategically along the Keys for the past 7 years. These stations monitor wind speed, wind direction, precipitation, barometric pressure, air temperature, solar irradiance near surface and at 3m, seawater temperature near surface and 3m depth, and surface salinity.

rated for all strategies. The component activities within each strategy, and the institutions responsible for implementing them, have been identified.

The strategies for the Management Plan, which includes Research and Monitoring Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the Sanctuary and will have some level of activity

in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Research and Monitoring Strategies.** The plan includes the 27 strategies within Alternative III that have a research and/or monitoring component. The highest-ranking strategies, in terms of overall priority, are Water Quality Monitoring, Ecological Reserves, and Sanctuary Preservation Areas. These strategies include major research and monitoring efforts, and are critical to the ultimate success of the Sanctuary. Thirteen other research and monitoring strategies are included in both medium and high priority levels. As stated above,

the strategies in the first two priority levels are planned to have some level of activity in year 1.

Research and monitoring strategies are organized into five theme groups: research management; monitoring; fisheries impacts; environmental assessment; and predictive strategies. Research management strategies are those that facilitate or enhance the capabilities for conducting research and monitoring within the Sanctuary. Monitoring strategies are composed of those that establish monitoring programs of Sanctuary resources. The fisheries impacts group includes seven strategies that will provide basic research on fisheries management techniques, aquaculture, the impacts of artificial reefs, and harvesting methods. Environmental assessment strategies will result in the assessment of environmental conditions within the Sanctuary. Predictive strategies will provide research that will allow resource managers to assess the potential impact of selected management strategies.

**Relationship to Other Action Plans.** Because of the need to establish separate management components (i.e., research, water quality, regulatory, volunteer) within the Sanctuary, research and monitoring strategies in this plan also appear in other action plans. For example, in addition to having a research thrust, a strategy may also have a water quality, volunteer, or regulatory component. All of the water quality strategies, with the exception of Ecological Monitoring (W.33), are only given by title in this plan. The detailed implementation scheme for these strategies is provided in the Water Quality Action Plan. If a strategy appears in more than one action plan and/or components of the strategy appear in other action plans, this is noted in the description.

## Goals and Objectives

The primary goal of the Research and Monitoring Program is to provide the knowledge necessary to make informed decisions about protecting the biological diversity and natural ecosystem processes of the Sanctuary and its resources.

**Sanctuary Goals.** Two acts, the NMSA and the FKNMSPA, establish additional research and monitoring goals, including the:

- identification of priority areas for research;
- establishment of an ecological monitoring program;
- development of standards based on biological monitoring or assessment to ensure the protection and restoration of water quality, coral reefs, and other marine resources;
- establishment of a comprehensive water quality monitoring program to determine the sources of pollution and evaluate the results of pollution-reduction efforts;
- evaluation of progress in achieving water quality standards and protecting and restoring the Sanctuary's coral reefs and living marine resources;
- establishment of strong communication and cooperation between the scientific community and resource managers;
- coordination of research efforts to achieve the most beneficial results; and
- promotion of public awareness and resource stewardship.

**Sanctuary Objectives.** To achieve these goals, the following objectives should be met:

- provide leadership and coordination in research and monitoring activities by: a) recruiting other institutions to carry out priority actions under the Sanctuary program, including volunteer groups that can foster an attitude of community stewardship; and b) registering researchers within the Sanctuary in order to share information about research activities and encourage coordination and cooperation among scientists and resource managers;

- outline information needs and set priorities for research and monitoring that address issues related to management actions to be implemented and evaluated over the next five years, such as: a) baseline studies and long-term monitoring programs addressing water quality and the evaluation of water quality improvement strategies; b) studies on the impacts to habitats and their recovery from physical damage, as well as the effectiveness of restoration actions; c) baseline surveys and long-term monitoring that measure the ecological effects of establishing no-take zones and Wildlife Management Areas; and d) studies that distinguish human impacts from natural variability and contribute to biologically-based standards for the sustainable use of the Sanctuary;
- encourage and provide support for research and monitoring that lead to a better understanding of key ecological processes and criteria for recognizing ecological change;
- take a lead role in making the results of research and monitoring efforts available to all audiences, either directly or through collaborating institutions;
- ensure research is funded on an open and competitive basis;
- coordinate research permitting among agencies; and
- use research and monitoring results to evaluate management actions and improve them accordingly.

## Description of Strategies

### Research Management

Research management strategies include those that facilitate or enhance the capabilities for conducting research and monitoring within the Sanctuary. The first strategy will result in the development of a sanctuary-wide permitting program to allow researchers, educators, and others to conduct prohibited activities under certain circumstances. The second strategy will result in the development of a regional database for storing research and monitoring results. The third strategy (W.29) creates a program to disseminate information about research findings among scientists and resource managers. The fourth strategy (W.32) establishes an advisory committee for coordinating and guiding research activities relating to water quality, and ecology.

#### Research Management Strategies

##### B.11: National Marine Sanctuary Permits

- Establish permitting program

##### W.28: Regional Database

(This strategy is described in detail in the Water Quality Action Plan)

##### W.29: Dissemination of Findings

(This strategy is described in detail in the Water Quality Action Plan)

##### W.32: Technical Advisory Committee

(This strategy is described in detail in the Water Quality Action Plan)

### B.11: National Marine Sanctuary Permits

Establish permits (e.g., for researchers, educators, emergency response personnel, salvors, and salvage operators) to conduct activities otherwise prohibited within the Sanctuary; facilitate simplified permitting of research activities.

*(Completed in Year 1)*

**Activity 1- Establish Permitting Program.** This strategy will allow researchers, educators, and others to conduct prohibited activities if those activities will: 1) further research and monitoring in the Sanctuary; 2) further the educational, natural, or historical resource value of the Sanctuary; or 3) assist in managing the Sanctuary. Permits will be monitored and their provisions enforced. The permitting program will enable oversight of the research occurring within the Sanctuary. In addition, for those research activities occurring in the Sanctuary that are not prohibited, there is a voluntary research registry.

See §922.166 of the regulations in the Regulatory Action Plan for details on the permit requirements.

■**Existing Program Implementation.** Research permits for the Looe Key and Key Largo National Marine Sanctuaries are currently issued by NOAA's Sanctuaries and Reserves Division. The FDEP and Monroe County also issue permits for certain activities within their jurisdiction.

■**Implementation.** Research permitting is essential, and will be conducted by Sanctuary staff and coordinated with the FDEP. All permitting will be conducted by the on-site Sanctuary manager, and permit possession will be enforced by Sanctuary staff. Research must be allowed to continue with minimal disruption following implementation of the Management Plan. When determining research to be conducted, the potential for damage will be compared to the expected benefits of the results. Research that may result in resource alteration must be of the highest quality and considered highly beneficial to the Sanctuary. Permitting will not require substantial resources, and should be maintained regardless of funding changes. The results of permitted research will be evaluated through peer review.

■**Schedule.** This activity has been completed.

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### **W.28: Regional Database**

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Establish a regional database and data management system for recording research results and biological, physical, and chemical parameters associated with Sanctuary monitoring programs. *(Priority Level High, High Level of Action in Year 1, 12 Months to Complete, 75% Funding Available for Full Implementation)*

*This strategy is described in detail in the Water Quality Action Plan.*

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### **W.29: Dissemination of Findings**

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Develop a program to synthesize and disseminate scientific research and monitoring results, including an information exchange network, conferences, and support for the publication of research findings in peer-reviewed scientific journals.  
*(Priority Level Medium, Low Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

*This strategy is described in detail in the Water Quality Action Plan.*

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### **Strategy W.32: Establish Technical Advisory Committee**

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Establish a Technical Advisory Committee for coordinating and guiding research activities for both NOAA and EPA.  
*(This strategy has been completed)*

*This strategy is described in detail in the Water Quality Action Plan.*

### **Monitoring**

This group is composed of strategies that establish monitoring programs for Sanctuary resources. This group includes the three major monitoring strategies (Water Quality, Ecological Monitoring, and Fisheries Monitoring), and two strategies designed to enhance monitoring techniques. All of these strategies will be implemented in year 1.

Monitoring is essential to achieve the primary goal of resource protection. The purpose of monitoring is to first, establish a baseline of resources, processes, and functioning of the ecosystem against which standards for resource protection can be measured, and, second, to assess the status and trends of the ecological resources. Monitoring provides a means to anticipate future problems before they require expensive solutions. The objectives of the monitoring program are to:

### Monitoring Strategies

#### F.6: Fisheries Sampling

- Evaluate and modify existing census programs
- Initiate a fishery pre-recruitment monitoring effort

#### W.20: Monitoring

(This strategy is described in detail in the Water Quality Action Plan)

#### W.33: Ecological Monitoring

- Hire a research and monitoring coordinator
- Establish an ecological information system
- Conduct status and trends assessment
- Establish a fisheries ecological monitoring and research component
- Establish a data management protocol
- Develop a periodic report on Sanctuary health
- Establish a volunteer monitoring program

#### Z.2: Ecological Reserves

- Develop baseline data
- Monitor ecological reserves
- Utilize ecological reserves as controls
- Utilize as a research area

#### Z.3: Sanctuary Preservation Areas

- Develop baseline data
- Monitor SPAs
- Utilize SPAs as controls
- Utilize as a research area

#### Z.5: Special-Use Areas

- Develop baseline data
- Monitor SUAs
- Utilize SUAs as controls
- Utilize as a research area

- utilize the Sanctuary Preservation Areas and Ecological Reserves as primary monitoring areas,
- establish an ongoing and open dialogue between scientists, managers, and the public to facilitate an efficient and responsive monitoring program,
- coordinate with the Environmental Protection Agency (EPA)/Florida Department of Environmental Protection (FDEP) Water Quality Monitoring Program to maximize the use of limited resources;
- establish an effective feedback mechanism between research and monitoring in order to maximize the use of limited resources,
- assess the status and trends of corals, fish, plankton, seagrasses, mangroves, and benthic organisms,

- assess the overall health of the ecosystem, and
- provide information for the development of a predictive model of the Florida Keys ecosystem

Monitoring efforts in the Sanctuary will focus on the Sanctuary Preservation Areas and Ecological Reserves. These zones were established for the purpose of protecting biological resources and ecosystem processes, as such, their effectiveness can only be determined by monitoring the status and trends of biological resources within and outside of the zones

### Strategy F.6: Fisheries Sampling

Enhance the resolution of existing commercial and recreational fisheries-dependent and independent sampling programs to provide statistics on catch and effort. This will be accomplished by establishing statistical areas based on "completeness criteria" including scientific need. Initiate fisheries independent sampling programs to measure the pre-recruitment of economically important species within the statistical areas. Regulations will be developed and implemented in accordance with the FMFC and the protocols for consistent regulations in strategy F 1 (*Priority Level High, High Level of Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation*)

#### Activity 1-Evaluate and Enhance Existing Census Programs.

Existing commercial landing and recreational creel census programs will be evaluated and enhanced to provide statistically based management information for regulating take. This includes the assessment and modification of information types and mandatory versus voluntary information. To increase the resolution of the programs, statistical areas will be established to provide information on catch and effort. The number of areas will be based on "completeness criteria," including scientific need

**Implementation** The FDEP will have the primary responsibility for implementing this activity. The National Marine Fisheries Service (NMFS), National Park Service (NPS), the South Atlantic and Gulf of Mexico Fishery Management Councils (SAFMC and GMFMC), and the Florida Marine Fisheries Commission (FMFC) will provide primary support

■ **Schedule.** This activity will have a high level of action in year 1 for evaluation and recommendations. It will require 12 months to complete. Funding for enhancement does not exist, and no schedule has been determined.

**Activity 2-Initiate a Fishery Pre-recruitment Monitoring Effort.** A fisheries pre-recruitment monitoring effort will be initiated for the long-term prediction of fishery stocks for Sanctuary-level management. This effort will be independent of commercial monitoring activities; FDEP has begun implementation of fishery pre-recruitment monitoring efforts for other areas in the state. Several statistical areas will be established, and this activity will evaluate and implement the programs to that level.

■ **Existing Program Implementation.** The FDEP has partially implemented a statewide fisheries pre-recruitment monitoring program that will include the Sanctuary.

■ **Implementation.** The FDEP will have the primary responsibility for implementing this activity, as part of their current fisheries monitoring program. Any regulations derived from this information will be developed by the FMFC. No funding is available for Sanctuary-wide monitoring.

■ **Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

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## **W.20: Monitoring**

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Conduct a long-term, comprehensive monitoring program as described in the EPA Water Quality Protection Program.

*(Priority Level High, Low Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

**This strategy is described in detail in the Water Quality Action Plan.**

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## **Strategy W.33: Ecological Monitoring**

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Develop and implement a Sanctuary-wide, intensive ecosystem monitoring program. The objective of the program will be to monitor the status of various biological and ecological indicators of system components throughout the Sanctuary and adjacent areas in order to discern the local and system-wide effects of human and natural disturbances and assess the overall health of the Sanctuary.

This strategy will establish a comprehensive, long-term monitoring program throughout the Sanctuary and adjacent areas that will have three purposes: 1) to supply resource managers with information on the status of the health of living resources and the ecosystem; 2) to determine causal relationships related to management decisions; 3) and to evaluate the effectiveness of management actions such as zoning implementation.

The Ecological Monitoring Program will be fully integrated with the Water Quality Monitoring Program through the Technical Advisory Committee, and will include: a temporal and spatial ecological information system based on current knowledge; status and trends assessments of corals, fishes, seagrasses, benthic organisms, algae, and mangroves; a fisheries ecology monitoring and research component to examine community composition and function within the Sanctuary's habitats; a data analysis, management, and dissemination protocol; a periodic report on Sanctuary health; and a volunteer monitoring program.

*(Priority Level High, Medium Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

■ **General Implementation.** NOAA will be responsible for the overall implementation of the Ecological Monitoring Program, working with the EPA, FDEP, academic and nongovernmental organizations (NGOs), and the TAC. NOAA will have the lead responsibility for implementing most activities, but the FDEP will be responsible for establishing an ecological information system (Activity 2) and data analysis, management, and dissemination protocol (Activity 5).

■ **General Relationship to Other Strategies.** Integration of the Ecological Monitoring Program and the Water Quality Protection Program will be achieved through the management committee specified in the Water Quality Protection Program. The TAC will be

used by NOAA to assist in the design and prioritization of the Research and Monitoring Program. The Sanctuary Superintendent will serve on the management committee that coordinates and facilitates the efforts of the TAC.

■ **General Schedule.** The Ecological Monitoring Program will have a medium level of action in year 1. It will require 60+ months to complete.

■ **Activity 1-Hire a research and monitoring coordinator.** A research and monitoring coordinator is needed to develop and maintain the Monitoring Program, coordinate research activities, oversee the permitting of research, assist in maintaining and updating the ecological information system, and act as a liaison with the Water Quality Protection Program, FDEP/FMRI, National Undersea Research Center, and other organizations.

■ **Existing Program Implementation.** Currently, a Sanctuary program specialist serves as the Sanctuary research coordinator.

■ **Implementation.** NOAA and the FDEP will collaborate on hiring the coordinator.

■ **Schedule.** This activity will have no action in year 1. It will require 6 months to complete.

■ **Activity 2-Establish an Ecological Information System.** Spatial and temporal information about ecological resources will be incorporated into an existing Federal or State geographic information system (GIS). Information that summarizes benthic habitats, species distributions, species life histories, etc. will be included in this system. This is essential baseline data for an effective ecological monitoring program. Information will be derived from existing sources such as the Minerals Management Service/Marszalek maps and the NOAA/FDEP benthic habitat maps.

■ **Existing Program Implementation.** The FDEP has several projects underway that should meet this need. For example, it is currently establishing a marine geographic information system that will include information on the Keys. Monroe County is also developing a GIS for land-use analysis, with some marine applications. In addition, NOAA is developing spatial and temporal information for the Keys in its GeoCOAST GIS Facility.

■ **Implementation.** The FDEP will be responsible for implementing this activity. It will be accessible by the Sanctuary staff over the Internet.

### International Coral Monitoring Efforts

- The United Nations' Environment Program, in cooperation with several international organizations, has initiated a planning process for establishing a global coral ecosystem (including associated seagrass and mangrove ecosystems) monitoring network. Researchers in Australia have designed and tested a prototype sampling methodology for this effort.
- In the Caribbean region, CARICOMP is a program of the Intergovernmental Oceanographic Commission and UNESCO, involving 21 marine laboratories in 16 countries, whose purpose is to standardize methodologies for monitoring corals, seagrasses, and mangroves.
- The Nature Conservancy is compiling a database on habitat classifications and threatened coral species in the Caribbean region.
- The Sanctuary's Ecological Monitoring Program will adopt established international guidelines for monitoring corals, seagrasses, and mangroves, and the Sanctuary may be a candidate for a sampling site or training center for the global network.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 24 months to complete.

■ **Activity 3-Conduct Status and Trends Assessments of Corals, Fishes, Seagrasses, Benthic Organisms and Algae, and Mangroves.** Biological indicators for each of these biotic components will be selected by NOAA, with assistance from the TAC, and will be monitored intensively. Some indicators being considered are:

- coral cover: overall increase in living coral of 5%, or a total of 30% cover for specific areas;
- coral diversity: no significant decline in existing levels of diversity with the increase in overall percent cover described above;
- coral indices: percent of coral as a function of fleshy algae biomass will increase, and percent of living coral tissue as a function of dead tissue in massive corals will increase to greater than 55 percent;
- coral recruitment: increase in successful recruitment of coral as reflected in size distribution curves;

## *Action Plans: Research and Monitoring*

- fish: increase in numbers of ecologically important species, such as cleaning gobies; while a high diversity of feeding guilds is maintained.
- shellfish: spiny lobster population is maintained at optimum sustainable yield;
- algae: decrease in percent of macro-algae cover and canopy height and decrease in extent and frequency of algal blooms;
- sponges: increase in abundance and biomass of sponges;
- sedimentation: decline in rates of deposition of sediments along the coral reef tract.

A baseline survey of the indicators will be conducted over a two-year period beginning in 1997. A status and trends report of indicator conditions will then be compiled on a periodic basis.

■**Existing Program Implementation.** A number of monitoring programs are already operating in the Sanctuary. For example, in 1994 the Water Quality Monitoring Program commenced, which includes water quality, seagrass and coral/hardbottom components. The University of Miami's Center for Marine and Environmental Analysis is undertaking a major, 6-year, multimillion dollar effort to model various aspects of the South Florida environment, including the development of indicators.

■**Implementation.** NOAA will be responsible for implementing this activity, but the FDEP will play a primary role in implementation. Academic institutions will provide additional assistance. The TAC will help NOAA choose the appropriate indicators.

■**Schedule.** This activity will have a high level of action in year 1. It will require 24+ months to complete.

**Activity 4-Establish a Fisheries Ecology Monitoring and Research Component to Examine Community Composition and Function within the Sanctuary's Habitats.** Fisheries are an important component of the Keys' ecosystem, both in terms of use values and ecological function. For example, grazing by herbivorous reef fish provides an important balancing force in controlling algal growth on corals. Overharvesting of herbivorous reef fish upsets this balance. Monitoring fish population dynamics, as well as studying life histories, should focus on answering questions about the effects of exploitation

and the relationship between fish species and the areas they inhabit, particularly concerning recruitment. Results of the Monitoring Program may be used by fishery resource and Sanctuary managers to develop population, community, and ecosystem-level models.

■**Existing Program Implementation.** The NMFS has taken a yearly census of fish populations for 10 years at the Key Largo and Looe Key National Marine Sanctuaries. Since 1986, the FDEP/FMRI has administered a fishery-dependent monitoring program, including such things as the snapper-grouper complex, pompano, dolphin, mackerel, and spiny lobster. The FMRI has also conducted a recreational site survey in Monroe County since 1986, revealing information about fishing activity, geographic location, habitat use, and catch composition.

■**Implementation.** NOAA will select the indicator species that will represent both commercially and functionally important species, as well as the major habitats of the Sanctuary (i.e., coral reefs, seagrasses, mangroves, hardbottom, etc). All life history stages of the indicator species should be monitored. Once indicator species are chosen, NOAA will establish a sampling regime, based on the FDEP's benthic habitat maps, that will coincide as much as possible with the water quality sampling regime. Management zones, specifically Sanctuary Preservation Areas and Ecological Reserves, will be included in the sampling regime (see strategies Z.2 and Z.3). Sampling strategies for adult reef fishes should use a nondestructive visual technique such as that developed by the NMFS for the Biscayne National Park. Sampling began in 1994.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 24+ months to establish.

**Activity 5-Establish a Data Analysis, Management, and Dissemination Protocol.** Establish a regional database and data management system for recording research results and biological, physical, and chemical parameters associated with Sanctuary monitoring programs. Develop a program to disseminate scientific research results, including an information exchange network, conferences, and support for the publication of research findings in peer-reviewed scientific journals.

**For information on the implementation schedule of this activity, see strategies W.28 (Regional Database) and W.29 (Dissemination of Findings).**



**Activity 6-Develop a Periodic Report on Sanctuary Health.** Develop a periodic report on Sanctuary Health. A report will be produced periodically to communicate to the public and policymakers the current status of Sanctuary resources. The report should be as simple and straightforward as possible and utilize a consistent format from issue to issue.

■**Implementation.** NOAA will produce the report with the assistance of other agencies, scientists, and the public. The TAC will be used for scientific peer review.

■**Schedule.** This activity will have no action in year 1. It will require 12 months to complete and will be done on a periodic basis.

**Activity 7 - Establish a Volunteer Monitoring Program.** Volunteer monitoring, if carried out by trained individuals, presents a viable and cost-effective means of collecting data on the status and trends of various ecological indicators.

■**Existing Program Implementation.** The Nature Conservancy (TNC), in cooperation with NOAA, has established a volunteer monitoring program for marine benthic communities in the Keys.

■**Implementation.** TNC, in cooperation with NOAA, should continue to take the responsibility for developing and implementing a volunteer monitoring program.

■**Schedule.** This will be a continuous activity throughout the duration of the program.

***This strategy is also included in the Volunteer and Water Quality action plans.***

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### Strategy Z.2: Ecological Reserves

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These areas are designed to encompass large, contiguous diverse habitats. They are intended to provide natural spawning, nursery, and permanent residence areas for the replenishment and genetic protection of marine life, and to protect and preserve all habitats and species. These reserves are intended to protect areas that represent the full range of diversity of resources and habitats found throughout the Sanctuary. The intent is to meet these objectives by limiting consumptive activities, while continuing to allow activities that are compatible with resource protection. This will provide the opportunity for these

areas to evolve in a natural state, with a minimum of human influence. These zones will protect a limited number of areas that represent the diverse habitats within the Sanctuary, and that provide important habitat for sustaining natural resources such as fish and invertebrates. These areas have been selected to protect and enhance biodiversity and provide natural spawning, nursery, or permanent residence areas that will serve to replenish stocks of all species, particularly those not protected by fishery management regulations.

*(Priority Level High, Medium Level of Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Develop Baseline Data.** Before monitoring begins, a baseline survey of existing resources in each Ecological Reserve must be conducted. The surveys will characterize the status of important marine species and their habitat.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The NMFS and FDEP will provide support in implementing this activity.

■**Schedule.** This activity will have a high level of action in year 1. It will require 24 months to complete.

**Activity 2-Monitor Ecological Reserves.** Research and monitoring activities will be conducted in these areas to provide important information for comparing the effects of natural processes and consumptive activities on species and habitats. These ecological monitoring studies will determine if the area's biodiversity and productivity are being adequately protected by the exclusion of consumptive activities. Based on the results of this activity, the five-year update of the Management Plan will consider expanding, modifying, or eliminating these zones.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and EPA will provide primary support.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

**Activity 3-Utilize Ecological Reserves as Controls.** Ecological Reserves will be utilized as controls to determine the effects of consumptive and nonconsumptive activities in disturbed areas. Based on the results of this activity, the five-year update of the Management Plan will consider expanding, modifying, or eliminating these zones.

■ **Existing Program Implementation.** Some consumptive activities are currently limited in Key Largo and Looe Key National Marine Sanctuaries, and these sites will be used to establish controls for ecological reserves.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and EPA will provide primary support.

■ **Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

**Activity 4-Utilize Ecological Reserves as Research Areas.** Ecological Reserves will provide scientists, resource managers and the public with an opportunity to observe and study a naturally functioning ecosystem with minimal human disturbance. Researchers may be permitted to conduct non-invasive experiments within the reserves to address management issues such as: a) the impacts to habitats and their recovery from physical damage, as well as the effectiveness of restoration actions; b) distinguishing human impacts from natural variability; c) establishing biologically based standards for the sustainable use of the Sanctuary; and d) understanding key ecological processes in order to develop criteria for recognizing ecological change. Based on the results of this activity, the five-year update of the Management Plan will consider expanding, modifying, or eliminating these zones.

■ **Existing Program Implementation.** Some consumptive activities are currently limited in Key Largo and Looe Key National Marine Sanctuaries.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and EPA will provide primary support.

■ **Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

**The process to prioritize and implement zone marking is discussed in the Zoning Action Plan. The regulations for Sanctuary Preservation Areas are included in the Regulatory Action Plan.**

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### **Strategy Z.3: Sanctuary Preservation Areas**

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These zones will focus on the protection of shallow, heavily used reefs where conflicts occur between user groups, and where concentrated visitor activity leads to resource degradation. They are designed to enhance the reproductive capabilities of renewable resources, protect areas that are critical for sustaining and protecting important marine species, and reduce user conflicts in high-use areas. This will be accomplished through a prohibition of consumptive activities within these areas. They have been chosen based on the status of important habitat, the ability of a particular area to sustain and protect the habitat, the level of visitor use, and the degree of conflict between consumptive and nonconsumptive users. The actual size and location of these zones have been determined by examination of user patterns, aerial photography, and ground-truthing of specific habitats.

*(Priority Level High, Medium Level of Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Develop Baseline Data.** Before monitoring begins, a baseline survey of existing resources in each SPA must be conducted. The surveys will characterize the status of important marine species and their habitat.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The NMFS and FDEP will provide support in implementing this activity.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 24 months to complete.

**Activity 2-Monitor SPAs.** Research and monitoring activities will be conducted in these areas to provide important information for comparing the effects of natural processes and consumptive activities on species and habitats. These ecological monitoring studies will determine if the area's diversity and productivity are being adequately protected.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and EPA will provide primary support.

■ **Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

**Activity 3-Utilize SPAs as Controls.** SPAs will be used as controls to determine the effects of consumptive and nonconsumptive activities in disturbed areas.

■**Existing Program Implementation.** Some consumptive activities are currently limited in the Key Largo and Looe Key National Marine Sanctuaries.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and EPA will provide primary support.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

**Activity 4-Utilize SPA's as Research Areas.**

Researchers may be permitted to conduct non-invasive experiments within the SPA's to address management issues such as: a) the impacts to habitats and their recovery from physical damage, as well as the effectiveness of restoration actions; b) distinguishing human impacts from natural variability; c) establishing biologically-based standards for the sustainable use of the Sanctuary, and d) understanding key ecological processes in order to develop criteria for recognizing ecological change. Based on the results of this activity, the five-year update of the Management Plan will consider expanding, modifying, or eliminating these zones.

■**Existing Program Implementation.** Research has been conducted in many of the SPAs, such as Looe Key and Conch Reef.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and academic institutions will provide primary support.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

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### **Strategy Z.5: Special-Use Areas**

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This strategy establishes zones to set aside areas for scientific research and educational purposes, restoration, monitoring, or to establish areas that confine or restrict activities such as personal watercraft operations and establish live-aboard mooring

fields. These areas will minimize impacts on sensitive habitats and reduce user conflicts. Special management programs (e.g., monitoring, research, Special-use Permits and restoration) can be conducted without impediment in these areas. They can be used to set aside areas for specific uses, such as long-term research and monitoring, and/or minimizing the adverse environmental effects of high-impact activities. (*Priority Level Medium, Low Level of Action in Year 1, 12+ Months to Complete, <50% Funding Available for Full Implementation*)

**Activity 1-Develop Baseline Data.** Before monitoring begins, a baseline survey of existing resources in each Special-use Area (SUA) must be conducted. The surveys will characterize the status of important marine species and their habitat.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The NMFS and FDEP will provide support in implementing this activity.

■**Schedule.** This activity will have a high level of action in year 1. It will require 24 months to complete.

**Activity 2-Monitor SUAs.** Research and monitoring activities will be conducted in these areas to provide important information for comparing the effects of natural processes and consumptive activities on species and habitats. These ecological monitoring studies will determine if the area's diversity and productivity are being adequately protected.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and EPA will provide primary support.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

**Activity 3-Utilize SUAs as Controls.** Some SUAs will be used as controls to determine the effects of consumptive and nonconsumptive activities in disturbed areas.

■**Existing Program Implementation.** Some consumptive activities are currently limited in the Key Largo and Looe Key National Marine Sanctuaries.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and EPA will provide primary support.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

**Activity 4-Utilize SUA's as Research Areas.**

Researchers may be permitted to conduct non-invasive experiments within the SUAs to address management issues such as: a) the impacts to habitats and their recovery from physical damage; as well as the effectiveness of restoration actions; b) distinguishing human impacts from natural variability, c) establishing biologically-based standards for the sustainable use of the Sanctuary; and d) understanding key ecological processes in order to develop criteria for recognizing ecological change. Based on the results of this activity, the five-year update of the Management Plan will consider expanding, modifying, or eliminating these zones.

***The process to prioritize and implement zone marking is discussed in the Zoning Action Plan. The regulations for Special-Use Areas are included in the Regulatory Action Plan.***

## Fisheries Impacts

Fisheries impacts strategies include seven fisheries-related strategies that will provide for basic research on fisheries management techniques, aquaculture, the impacts of artificial reefs, and harvesting methods.

### Fisheries Impacts Strategies

**F.3: Stocking**

- Assess impacts from fish stocking

**F.4: Aquaculture Alternatives**

- Assess, develop, and promote aquaculture alternatives

**F.7: Artificial Reefs**

- Assess impacts from artificial reef development

**F.10: Bycatch**

- Assess impacts from harvesting methods

**F.11: Gear/Method Impacts**

- Conduct research on low-impact fishing gear and methods

**F.14: Spearfishing**

- Assess impacts on fish populations
- Determine incidental habitat damage

**F.15: Sponge Harvest**

- Assess impacts of sponge harvest methods

## Strategy F.3: Stocking

Any ongoing or proposed stocking activities within the Sanctuary must be permitted. Develop a permitting policy for stocking Sanctuary waters that addresses genetic and other biological concerns for both fauna and flora, including seagrass. Assess existing research on the impacts of stocking on the genetic integrity of native stocks. Conduct research on natural stock recovery and its role in maintaining genetic integrity. Conduct a reevaluation of stocking options.

*(Priority Level Low, No Action in Year 1, 36 Months to Complete, No Funding Available for Full Implementation)*

**Activity 1-Assess Impacts from Fish Stocking.**

The research will build on native stock integrity research conducted elsewhere to determine the effects of fish stocking on the genetic integrity of native species within the Sanctuary. The extent to which changes in the genetic integrity of native stocks have occurred or are likely to occur, and the effects of these changes on abundance, distribution, and life histories, will be determined. Research results will be used to develop and implement regulations governing stocking activities.

■**Existing Program Implementation.** This activity is an existing research priority of the FDEP.

■**Implementation.** The FDEP and NMFS will be primarily responsible for implementing this activity. The Florida Marine Fisheries Commission (FMFC) will develop regulations regarding stocking. This activity is necessary before stocking activities can be considered to restore depleted fisheries. Funding changes will not affect this activity.

■**Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

## Strategy F.4: Aquaculture Alternatives

Assess, develop, and promote aquaculture alternatives for all commercially harvested marine species. Support efforts to eliminate the harvest and landing of wild live rock.

*(Priority Level Low, No Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Assess, Develop, and Promote Aquaculture Alternatives.** This activity will reduce the fishing pressures on commercially harvested marine life and satisfy the commercial demand for these species. This is a long-term effort designed to identify and develop aquaculture techniques and promote the development of environmentally sound aquaculture operations.

■ **Existing Program Implementation.** This is an existing priority of the Sea Grant Program, Florida Department of Agriculture and Consumer Services (FDACS), and FDEP.

■ **Implementation.** The Sea Grant Program, the Florida Department of Agriculture and Consumer Services (FDACS), and FDEP will be primarily responsible for implementing this activity as part of their current research programs. FDEP will assist in the implementation of this activity.

■ **Schedule.** This activity will have no action in year 1. It will require 36+ months to complete.

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### Strategy F.7: Artificial Reefs

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Conduct research on the impacts of artificial reefs on fish and invertebrate populations for long-term management including location, size, materials, etc. Monitor and evaluate habitat modification caused by the installation of marine structures. Assess and develop regulations for artificial reef construction and evaluate habitat suitability for artificial reefs. *(Priority Level Low, No Action in Year 1, 48+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Assess Impacts from Artificial Reef Development.** The effects of artificial reefs on fish abundance, community composition, and Sanctuary resources will be assessed. Appropriate artificial reef locations, based on habitat suitability will be determined. Volunteers will provide assistance.

■ **Existing Program Implementation.** The FDEP is currently reviewing the impacts and benefits of artificial reefs, and is developing design criteria.

■ **Implementation.** The FDEP will be primarily responsible for implementing this activity as part of their current artificial reef assessment program. Any regulations derived from this information will be

developed by the FMFC. Monroe County and the Sea Grant Program are also cooperating in this activity.

Changes in Sanctuary funding will not affect this activity. It will be performed by the cooperating agencies, the FMFC, and the Sanctuary staff.

■ **Schedule.** The activity will have no action in year 1. It will require 48+ months to complete.

**This strategy is also included in the Volunteer and Regulatory action plans.**

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### Strategy F.10: Bycatch

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Conduct an assessment of harvesting methods used that generate bycatch. Develop and implement regulations to reduce the effects of current fishing practices on nontargeted species. *(Priority Level Low, No Action in Year 1, 48+ Months to Complete, <25% Funding Available for Full Implementation)*

**Activity 1-Assess Impacts from Harvesting**

**Methods.** The impacts of harvesting methods on species composition and abundance will be determined, as will the indirect impacts on other species and the environment. The extent of the problem will be assessed, and research will be conducted on the impacts of existing fishing methods and gear. Based on research results, regulations will be developed and implemented to reduce the bycatch of incidental species and undersized targeted species.

■ **Existing Program Implementation.** The FMFC, the SAFMC, and the GMFMC are actively involved in this activity.

■ **Implementation.** The three fisheries organizations currently involved in this activity will share the primary responsibility for implementation. Sanctuary staff, the NMFS, FDEP, and Sea Grant Program will also cooperate in implementation efforts. Sanctuary staff will actively assist in research on fisheries practices affecting the area's resources. The level of participation will depend on the availability of additional field staff.

■ **Schedule.** The activity will have no action in year 1. It will require 48+ months to complete.

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### Strategy F.11: Gear/Method Impacts

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Conduct research on alternative fishing gear and methods that minimize impacts on habitat. Implement a voluntary program to encourage the use of low-impact gear and methods. Implement regulations to require the use of low-impact gear and methods in priority areas. Characterize harvesting stresses affecting outer and inshore reefs and hardbottom ecosystems.

*(Priority Level Low, No Action in Year 1, 48+ Months to Complete, <25% Funding Available for Full Implementation)*

**Activity 1-Conduct Research on Low-Impact Fishing Gear and Methods.** This activity will facilitate research to develop gear designs and types that minimize impacts to corals, hardbottom, seagrasses, and other habitat and species. Biodegradable fishing line, traps, and buoy lines are examples of gear types that would be researched. Modified trap designs would also be considered. Fishing methods, including resource handling and gear placement, would be researched to develop methods and gear that minimize impacts to resources while maintaining efficiency. Volunteers will provide assistance.

■**Existing Program Implementation.** The FMFC, SAFMC, and GMFMC are actively involved in this activity.

■**Implementation.** The three fisheries organizations will continue to have the primary responsibility for this high-priority activity. Sanctuary staff, the NMFS, FDEP, and the Sea Grant Program are also cooperating in this activity.

Changes in Sanctuary funding will not affect this activity. It will be performed by the cooperating agencies, and should be reflected in the examination of fisheries monitoring data.

■**Schedule.** The activity will have no action in year 1. It will require 48+ months to complete.

**This strategy is also included in the Volunteer Action Plan.**

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### Strategy F.14: Spearfishing

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Conduct an assessment of spearfishing practices and impacts to develop and implement regulations in high-priority areas.

*(Priority Level Low, No Action in Year 1, 36 Months to Complete, 0% Funding Available for Full Implementation)*

**Activity 1-Assess Impacts on Fish Populations.**

Conduct research to determine the effects of spearfishing on species population and abundance.

■**Implementation.** The FDEP will be the lead agency responsible for implementation, with primary support from the NMFS, the SAFMC, GMFMC, and the FMFC.

■**Schedule.** The strategy will have no action in year 1. It will require 36 months to complete.

**Activity 2-Determine Incidental Habitat Damage.**

Conduct research to determine the effects of spearfishing on the habitat due to incidental contact.

■**Implementation.** The FDEP will be the lead agency responsible for implementation, with primary support from the NMFS, the SAFMC, GMFMC, and the FMFC.

■**Schedule.** The strategy will have no action in year 1. It will require 24 months to complete.

**This strategy is also included in the Regulatory Action Plan. (Spearfishing will be prohibited in Ecological Reserves and Sanctuary Preservation Areas.)**

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### Strategy F.15: Sponge Harvest

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Develop and conduct a research program to assess the impacts of current sponge harvest methods on the resource and the habitats in which they occur. Develop and implement regulations throughout the Sanctuary.

*(Priority Level Medium, Medium Level of Action in Year 1, 36 Months to Complete, <75% Funding Available for Full Implementation)*

### **Activity 1-Assess Impacts of Sponge Harvest**

**Methods.** This strategy includes research and assessment activities to determine which methods have a low adverse impact on both species and habitat, and to identify areas that exhibit low abundance, low recovery rates, and habitat damage. The activity supports the development and implementation of regulations governing sponge harvest.

■**Implementation.** The FDEP will be primarily responsible for implementing this activity. The FMFC, SAFMC, and GMFMC will also participate.

Changes in Sanctuary funding will not affect the activity. Funding will be performed by the cooperating agencies and fisheries councils.

■**Schedule.** The activity will have a medium level of action in year 1. It will require 36 months to complete.

## **Special Studies**

Environmental assessment strategies will result in the assessment of environmental conditions within the Sanctuary. One of these strategies, Habitat Restoration (B.2), is high-priority and will be implemented in the short-term to provide research into restoration techniques.

### **Special Studies Strategies**

#### **B.2: Habitat Restoration**

- Develop stocking policy related to habitat restoration
- Conduct a program of restoration research

#### **R.5: Carrying Capacity**

- Assess impacts of recreation activities and estimate user carrying capacities

#### **W.5: Water Quality Standards**

(This strategy is described in detail in the Water Quality Action Plan)

#### **W.18: Pesticide Research**

(This strategy is described in detail in the Water Quality Action Plan)

#### **W.24: Florida Bay Influence**

(This strategy is described in detail in the Water Quality Action Plan)

## **Strategy B.2: Habitat Restoration**

Conduct a program of restoration research at representative habitat sites within the Sanctuary; develop a restoration plan and implement restoration in severely impacted areas. Monitor recovery processes. (*Priority Level Medium, Medium Level of Action in Year 1, 24+ Months to Complete, 50-74% Funding Available for Full Implementation*)

**Activity 1-Develop and Implement a Stocking Policy Related to Restoration Research.** Develop and implement a policy on stocking related to habitat restoration. Organisms need to be local genetic stock.

■**Existing Program Implementation.** FDEP has a draft stocking policy for the Florida Keys that will be used as a starting point.

■**Implementation.** Sanctuary staff and the FDEP will be jointly responsible for implementing this activity.

■ **Schedule.** The activity will have a medium level of action in year 1. It will require 12 months to complete.

**Activity 2 - Conduct a Program of Restoration Research.** Enhancing mangrove and seagrass habitats and coral transplanting are examples of restoration activities, but other techniques will be developed. A restoration plan will be implemented in severely impacted areas. Recovery processes (e.g., recruitment and survivability) will be monitored following stress events (e.g., vessel groundings), and an extensive demonstration project will be developed for mitigation and restoration techniques following physical disturbances or chronic nutrient inputs. Emergency or long-term restoration zones may be established to allow sufficient resource recovery. Volunteers will provide assistance.

■**Existing Program Implementation.** Limited coral restoration efforts and subsequent monitoring programs are underway as cooperative efforts among the Sanctuary staff, the FDEP, and the NPS. These efforts are funded by research grants and damage settlements. A response team has been established to assess damage quickly.

■**Implementation.** Sanctuary staff and the FDEP will be jointly responsible for implementing this high-priority strategy. Additional assistance will be sought

## *Action Plans: Research and Monitoring*

from Monroe County, the NMFS, U.S. Army Corp of Engineers (USACE), U.S. Fish and Wildlife Service (FWS), the Florida Game and Fresh Water Fish Commission (FGFWFC), and the research community.

Court judgements and settlements from groundings will fund restoration efforts and subsequent monitoring programs. A contingency fund would be available to initiate restoration efforts, since settlement funds are not likely to be made immediately available.

Since restoration activities are largely funded by damage settlements, they would not be affected by changing budgets (court judgements or settlement funds will not be diverted from their intended purpose). Follow-up monitoring of restoration efforts will evaluate the program's success.

■**Schedule.** The activity will have a medium level of action in year 1. It will require 24+ months to complete.

***This strategy is also included in the Volunteer Action Plan.***

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### **Strategy R.5: Carrying Capacity**

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Conduct a program to study and implement carrying-capacity limits for recreational activities by: 1) assessing the effects of recreational and boating activities on Sanctuary resources; 2) establishing recreational user carrying capacities that minimize wildlife disturbances and other adverse impacts on natural resources; and 3) enforcing carrying-capacity limits in high-use areas and for highly sensitive habitats throughout the Sanctuary.  
(Priority Level Medium. This strategy will have a low level of action in year 1, 48+ Months to Complete, <50% Funding Available for Full Implementation)

**Activity 1-Assess Impacts of Recreational Activities and Estimate User Carrying Capacities.** This activity will assess the impacts of recreation activities on Sanctuary resources to provide a basis for anticipating problems associated with specific activities and the development of management actions to eliminate/reduce impacts. Impacts such as wildlife disturbance (especially of commercially important and threatened/endangered species), changes in ecosystem balance, habitat degradation, and those associated with activities such as boating,

fishing, diving, etc. will be included. The research-only areas at Eastern Sambos and Tennessee Reef will serve as the primary sites for conducting carrying capacity research, specifically on water quality impacts versus user impacts. These research-only areas can be compared to other heavily used reefs such as Western Sambos and Looe Key. It is anticipated that once the research is completed, carrying-capacity limits will be established by instituting regulations that require the use of buoys in high-use areas and for highly sensitive habitats throughout the Sanctuary.

■**Implementation.** Sanctuary staff will have the primary responsibility for implementing this activity in the Sanctuary, with the assistance of the FDEP, FWS, and numerous other agencies. The USACE will be conducting a complementary carrying capacity study for Monroe County. Overuse of Sanctuary resources is one of the major management concerns, and a policy on acceptable use levels must be established based on the research conducted. This activity will require a major commitment of resources, and could be impacted by budget reductions.

■**Schedule.** This activity will have no action in year 1. It will require 48+ months to complete.

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### **Strategy W.5: Water Quality Standards**

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Develop and implement water quality standards, including biocriteria, appropriate to Sanctuary resources.

(Priority Level Low, No Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)

***This strategy is described in detail in the Water Quality Action Plan.***

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### **Strategy W.18: Pesticide Research**

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Develop and implement a research program to assess and investigate the impacts of, and alternatives to, current pesticide practices. Modify the Mosquito Control Program as necessary on the basis of research findings.

(Priority Level Low, No Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation)



***This strategy is described in detail in the Water Quality Action Plan.***

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### **Strategy W.24: Florida Bay Influence**

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Conduct research to understand the effect of water transport from Florida Bay on water quality in the Sanctuary.

*(Priority Level High, High Level of Action in Year 1, 48 Months to Complete, <50% Funding Available for Full Implementation)*

***This strategy is described in detail in the Water Quality Action Plan.***

#### **Predictive**

This strategy provides research allowing resource managers to assess the potential impact of various management strategies. The Predictive Models strategy, for example, establishes hydrodynamic water quality models and coupled, landscape-level ecological models that will be used to predict and evaluate the outcome of in-place and proposed water quality management strategies.

#### ***Predictive Strategies***

##### **W.21: Predictive Models**

*(This strategy is described in detail in the Water Quality Action Plan)*

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### **Strategy W.21: Predictive Models**

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Develop phased hydrodynamic/water quality models and coupled, landscape-level ecological models to predict and evaluate the outcome of in-place and proposed water quality management strategies.

*(Priority Level Medium, High Level of Action in Year 1, 12+ Months to Complete, <50% Funding Available for Full Implementation)*

***This strategy is described in detail in the Water Quality Action Plan.***

## Implementation

*This section explains how the strategies in the Research and Monitoring Action Plan will be implemented. The institutions responsible for each activity, and those agencies that will provide some level of assistance, are identified. In addition, the planned level of activity in year 1, months to complete, funding availability, cost estimates, staff requirements, and the geographic focus for each strategy/activity are provided. The process used to evaluate the effectiveness of the monitoring program as it evolves over time is described.*

**Responsible Institutions.** The Research and Monitoring Plan will be implemented by a coordinated framework of Federal, State, and local agencies in cooperation with academic and research institutions. In most cases, academic institutions should take the lead in implementing strategies and/or activities that deal with predictive modeling or research. NOAA and the FDEP, however, have the lead responsibility for overall program implementation. The EPA and FDEP will provide leadership in implementing many research and monitoring strategies. Table 18 lists the responsible institutions and their level of responsibility in each strategy/activity.

**Prioritization of Implementation.** The Research and Monitoring Action Plan includes the 23 strategies in Alternative III with a research and/or monitoring component. The highest-ranking strategies (based on overall priority) are Monitoring, Replenishment Reserves, and Sanctuary Preservation Areas. Each of these strategies includes major research and monitoring efforts and is critical to the ultimate success of the Sanctuary. In addition, 12 strategies within the Research and Monitoring Program are either high or medium priority level. Strategies in these priority levels are expected to be initiated within year 1 of the adoption of the final plan, and are generally designed to develop information to evaluate water quality and ecosystem health. However, they will also result in information that can be used in zoning, boating, and fisheries assessments.

**Schedule.** Twelve strategies in the plan will be implemented in year 1, focusing on ecological and water quality monitoring; developing a regional database and data management system; establishing a research and monitoring component of the Sanctuary's management zones and assessing the influence of Florida Bay on Sanctuary resources. A strategy establishing an advisory committee for

coordinating and guiding research activities (W.32) was completed prior to year 1. All other strategies will be implemented after year 1 (Table 19). Several strategies, such as WQ Monitoring and Ecological Monitoring, include continuous activities and are expected to continue indefinitely.

**Cost.** The estimated cost of implementing each strategy is given in Table 19. Two cost figures are shown for each strategy: capital; and operations and maintenance. The capital cost figure represents the amount of funding required to enable the purchase of equipment (boats, computers, etc.), construction of buildings and related facilities, computer equipment, land acquisition and other start-up costs. Operations and maintenance includes salaries, travel, rent, utilities, upkeep, supplies (e.g., fuel, paper, etc.), and other administrative costs.

**Geographic Focus.** All research and monitoring strategies apply to the entire Sanctuary. However, some of the strategies may include components that are applicable to specific areas in the Keys.

**Personnel.** The staff required to implement the Research and Monitoring Program will be a mix of personnel from various agencies and organizations identified in Table 18. In addition, scientists from various universities, research institutions, and environmental firms may be involved on a long- or short-term basis. For example, personnel from the EPA or FDEP will be responsible for implementing many of the strategies. However, for those strategies, Sanctuary personnel will provide assistance in directing the component activities. The remaining strategies will be directed by NOAA/FDEP personnel dedicated solely to research and monitoring activities.

**Sanctuary Employees.** Research and monitoring activities will require three full-time NOAA employees; a coordinator (\$40,000 per year), and two assistants (\$30,000 per year). The staff will be distributed among the three offices in Key Largo, Marathon, and Key West. Table 19 lists the total number of personnel likely to be involved in implementing each strategy.

**Volunteers.** Volunteers will provide assistance in implementing several research and monitoring strategies. Volunteer assistance has been targeted for the Habitat Restoration (B.2), Artificial Reefs (F.7), Gear/Method Impacts (F.11), WQ Monitoring (W.20), and Ecological Monitoring (W.33) strategies. A complete description of volunteer assignments for each research and monitoring strategy is included in

the Volunteer Action Plan. A Sanctuary volunteer coordinator will be responsible for directing all volunteer activities associated with research and monitoring.

**Contingency Planning for Changing Budget.** In the event of reduced or insufficient funding, the Program's focus will be modified to allow the implementation of the most important research and monitoring strategies. Only priority strategies (or a subset of the priority strategies) will be implemented in this case. Although the overall intent of the Research and Monitoring Program will not be achieved, this approach will permit research and monitoring activities that focus on critical Sanctuary issues. In addition, the scale and scope of individual strategies could be reduced, thereby preserving additional management strategies. For example, the number of monitoring stations included in strategy W.33 (Ecological Monitoring) could be reduced.

**Evaluating Program Effectiveness.** NOAA will conduct a periodic evaluation (approximately every three years) to determine the effectiveness of research and monitoring activities. The evaluation will identify the strategies/activities that are ineffective, and those that have not been adequately addressed. New strategies and activities within existing strategies will be established as the Program evolves. The objective is to optimize staff and resources in conducting research and monitoring to protect the ecosystem of the Sanctuary.

Table 18. Agencies/Organizations Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies/Organizations															
	NOAA-Sanctuary	NOAA-NMFS	EPA	FWS	NPS	USCG	USGS	USACE-Navy	SAFMC	GMFMC	FDEP	FGFWFC	FDCA	FDACS	FMFC	FDIC
<b>RESEARCH MANAGEMENT</b>																
<b>B.11 National Marine Sanctuary Permits</b>																
Establish Permitting Program	●			○	○					●						○
<b>W.28 Regional Database</b>																
Refer to Water Quality Action Plan																
<b>W.29 Disseminate Findings</b>																
Refer to Water Quality Action Plan																
<b>W.32 Advisory Committee</b>																
Refer to Water Quality Action Plan																
<b>MONITORING</b>																
<b>F.6 Fisheries Sampling</b>																
Evaluate and Modify Existing Census Programs		○		○					○	○	●			○		○
Initiate a Fishery Pre-recruitment Monitoring Effort										●				○		○
<b>W.20 Monitoring</b>																
Refer to Water Quality Action Plan																
<b>W.33 Ecological Monitoring</b>																
Hire a Research and Monitoring Coordinator	●									○						
Establish an Ecological Information System	○									●					○	
Conduct Status and Trends Assessment	●		○							○					○	○
Establish a Fisheries Ecology Monitoring and Research Component			●							○						
Establish a Data Management Protocol										●						○
Develop an Index on Sanctuary Health	●	○	○							○					○	○
Establish a Volunteer Monitoring Program	○															●
<b>Z.2 Ecological Reserves</b>																
Develop Baseline Data	●	○								○						
Monitor Reserves	●		○							○						
Utilize Reserves as Controls	●		○							○						
Utilize Reserves as Research Areas	●	○								○						
<b>Z.3 Sanctuary Preservation Areas</b>																
Develop Baseline Data	●	○								○						
Monitor SPAs	●		○							○						
Utilize SPAs as Controls	●		○							○						
Utilize SPAs as Research Areas	●	○								○						
<b>Z.5 Special-Use Areas</b>																
Develop Baseline Data	●	○								○					○	
Monitor SUAs	●		○							○					○	
Utilize SUAs as Controls	●		○							○					○	
Utilize SUAs as Research Areas	●	○								○					○	

● Lead ○ Primary Role ○ Assist

Table 18. Agencies/Organizations Identified for Implementing Strategies/Activities (cont.)

Strategy/Activity	Agencies/Organizations																								
	NOAA-Sanctuary	NOAA-NMFS	EPA	FWS	NPS	USCG	USGS	USACE+Navy	SAFMC	GMFMC	FDEP	FGFIFC	FDCA	FDACS	FMFC	FDOC	SFWMD	Monroe County	Municipalities	Academia	Sea Grant	NURC	TAC	NGO	
FISHERIES IMPACTS																									
F.3 Stocking																									
Assess Impacts from Fish Stocking		●			●				●	●	●				●					○	○	○			
F.4 Aquaculture Alternatives																									
Assess, Develop, and Promote Aquaculture Techniques		○							●	●	○			●	○	○					●				
F.7 Artificial Reefs																									
Assess Impacts from Artificial Reefs		○							○	○	●				○			●			●				
F.10 Bycatch																									
Assess Impacts from Harvesting Methods	○	○							●	●	○				●						○				
F.11 Gear/Method Impacts																									
Conduct Research on Low-Impact Fishing Gear and Methods		○							●	●	○				●					○	○				
F.14 Spearfishing																									
Assess Impacts on Fish Populations		○							○	○	●				○										
Determine Incidental Habitat Damage		○							○	○	●				○										
F.15 Sponge Harvest																									
Assess Impacts of Sponge Harvest Methods				○	○	○			●	●	●				●						●				
SPECIAL STUDIES																									
B.2 Habitat Restoration																									
Develop Stocking Policy		●	○								●														
Conduct a Program of Restoration Research		●	○		○			○			●	○					○			○					
R.5 Carrying Capacity																									
Assess Impacts to Recreation Activities and Estimate User Carrying Capacities		●	○		○	○		○			○		○					○	○						
W.5 Water Quality Standards									Refer to Water Quality Action Plan																
W.18 Pesticide Research									Refer to Water Quality Action Plan																
W.24 Florida Bay Influence									Refer to Water Quality Action Plan																
PREDICTIVE STRATEGIES																									
W.21 Predictive Models									Refer to Water Quality Action Plan																

● Lead ○ Primary Role ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; NMFS, National Marine Fisheries Service; EPA, U.S. Environmental Protection Agency; FWS, U.S. Fish and Wildlife Service; NPS, National Park Service; USCG, U.S. Coast Guard; USGS, U.S. Geological Survey; USACE, U.S. Army Corp of Engineers; SAFMC, South Atlantic Fisheries Management Council; GMFMC, Gulf of Mexico Fisheries Management Council; FDEP, Florida Department of Environmental Protection; FGFWFC, Florida Game and Fresh Water Fish Commission; FDCA, Florida Department of Consumer Affairs; FDACS, Florida Department of Agriculture and Consumer Services; FMFC, Florida Marine Fisheries Commission; FDOC, Florida Department of Commerce; SFWMD, South Florida Water Management District; NURC, National Underwater Research Center; TAC, Technical Advisory Council; NGO., Nongovernment Organizations.

Table 19. Requirements for Implementation

Strategy/Activity	Overall Sanctuary Priority Level +	Implementation			Cost to Complete		Geographic Focus	# of Personnel
		Planned Level of Activity in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/Maintenance (\$1,000)		
RESEARCH MANAGEMENT								
B.11 National Marine Sanctuary Permits	*	High	<12	100%	10-99	10-99	SW	2
W.28 Regional Database			Refer to Water Quality Action Plan					
W.29 Disseminate Research Findings			Refer to Water Quality Action Plan					
W.32 Advisory Committee			Refer to Water Quality Action Plan					
MONITORING								
F.6 Fisheries Sampling	High	High	36+	50-74%	1000-5000	1000-5000		11-25
Evaluate and Enhance Existing Census Programs	High	High	12	50-74%	NC	10-99	SW	
Initiate a Fishery Pre-recruitment Monitoring Effort	Medium	Medium	36+	50-74%	1000-5000	100-999	SW	
W.20 Monitoring			Refer to Water Quality Action Plan					
W.33 Ecological and Research Monitoring	High	Medium	60+	<50%	100-999	1000-5000		11-25
Hire a Research and Monitoring Coordinator	Medium	None	5	<50%	NC	10-99	SW	
Establish an Ecological Information System	High	High	24	50-74%	NC	100-999	SW	
Conduct Status and Trends Assessment	High	High	24+	<50%	100-999	100-999	SW	
Establish a Fisheries Ecology Monitoring & Research Component	High	Medium	24+	<50%	100-999	100-999	SW	
Establish a Data Management Protocol	High	None	12	75-99%	NC	10-99	SW	
Develop a Periodic Report on Sanctuary Health	Low	None	24+	<50%	10-99	10-99	SW	
Establish a Volunteer Monitoring Program	High	High	C	100%	10-99	10-99	SW	
Z.2 Ecological Reserves	High	Medium	36+	<50%	100-999	1000-5000		3-5
Develop Baseline Data	High	High	24	<50%	100-999	100-999	SW	
Monitor Reserves	Medium	Medium	36+	<50%	10-99	100-999	SW	
Utilize Reserves as Controls	Low	Medium	36+	<50%	10-99	10-99	SW	
Utilize Reserves as Research Areas								
Z.3 Sanctuary Preservation Areas	High	Medium	36+	<50%	100-999	1000-5000		3-5
Develop Baseline Data	High	High	24	<50%	100-999	100-999	SW	
Monitor SPAs	Medium	Medium	36+	<50%	10-99	100-999	SW	
Utilize SPAs as Controls	Low	Medium	36+	<50%	10-99	10-99	SW	3-5
Utilize SPAs as Research Areas								
Z.5 Special-Use Areas	High	Medium						
Develop Baseline Data	High	High	24	<50%	100-999	100-999	SW	
Monitor SUAs	Medium	Medium	36+	<50%	10-99	100-999	SW	
Utilize SUAs as Controls	Low	Medium	36+	<50%	10-99	10-99	SW	
Utilize SUAs as Research Areas								

Abbreviations: SW, Sanctuary Wide; UK, Upper Keys; C, Continuous.

+ The priority levels for activities should not be compared across strategies—they only represent the relative importance of activities contained within a strategy.

++ Strategies with an "\*" for Overall Sanctuary Priority Level are already existing programs and will be completed in Year 1.

Table 19. Requirements for Implementation (cont.)

Strategy/Activity	Overall Sanctuary Priority Level *	Implementation			Cost to Complete		Geographic Focus	# of Personnel
		Planned Level of Activity in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/ Maintenance (\$1,000)		
FISHERIES IMPACTS								
F.3 Stocking	Low	None	36		<10	100-999		1-2
Assess Impacts from Fish Stocking		None	36		<10	100-999	SW	
F.4 Aquaculture Alternatives	Low	None	36+	<50%	<10	100-999		1-2
Assess, Develop, and Promote Aquaculture Techniques		None	36+	<50%	<10	100-999	SW	
F.7 Artificial Reefs	Low	None	48+	<50%	10-99	10-99		1-2
Assess Impacts from Artificial Reefs		None	48+	<50%	10-99	10-99	SW	
F.10 Bycatch	Low	None	48+	<25%	<10	10-99		1-2
Assess Impacts from Harvesting Methods		None	48+	<25%	<10	10-99	SW	
F.11 Gear/Method Impacts	Low	None	48+	<25%	10-99	100-999		3-5
Conduct Research on Low-Impact Fishing Gear and Methods		None	48+	<25%	10-99	100-999	SW	
F.14 Spearfishing	Low	None	36	0%	10-99	10-99		1-2
Assess Impacts on Fish Populations	High	None	36	0%	10-99	10-99	SW	
Determine Incidental Habitat Damage	Medium	None	24	0%	10-99	10-99	SW	
F.15 Sponge Harvest	Medium	Medium	36	<75%	<10	10-99		1-2
Assess Impacts of Sponge Harvest Methods		Medium	36	<75%	<10	10-99	SW	
SPECIAL STUDIES								
B.2 Habitat Restoration	Medium	Medium	24+	50-74%	100-999	100-999		5-10
Develop Stocking Policy		High	12	100%	<10	0	SW	
Conduct a Program of Restoration Research		Medium	24+	50-74%	100-999	100-999	SW	
R.5 Carrying Capacity	Medium	Low	48+	<50%	100-999	1000-5000		5-10
Assess Impacts to Recreation Activities and Estimate User Carrying Capacities		Low	48+	<50%	100-999	1000-5000	SW	
W.5 Water Quality Standards			Refer to Water Quality Action Plan					
W.18 Pesticide Research			Refer to Water Quality Action Plan					
W.24 Florida Bay Influence			Refer to Water Quality Action Plan					
PREDICTIVE STRATEGIES								
W.21 Predictive Models	High		Refer to Water Quality Action Plan					

Abbreviations: SW, Sanctuary Wide; UK, Upper Keys; C, Continuous.

\* The priority levels for activities should not be compared across strategies—they only represent the relative importance of activities contained within a strategy.

++Strategies with an "\*" for Overall Sanctuary Priority Level are already existing programs and will be completed in Year 1.

# Submerged Cultural Resources Action Plan

***This action plan identifies and describes the suite of activities for the management and protection of submerged cultural resources within the Florida Keys National Marine Sanctuary. The activities described in this plan address resource protection, multiple uses, inventory, research and education and are derived from the Submerged Cultural Resources Management strategies, public comments, and other record sources. The action plan is the result of a careful balancing of resource protection and facilitating compatible multiple uses. The plan outlines the time required for implementation, level of program activity in year 1, the funding available for full implementation, institutions responsible for implementation, and range of costs for full implementation (Table 20). The Action Plan also contains the SCR Agreement among NOAA, the State and the Advisory Council on Historic Preservation providing further detail on how historic resources within the Sanctuary will be managed.***

## Introduction

NOAA is committed to protecting and preserving the natural resources within its national marine sanctuaries, and is equally committed to its stewardship and trustee responsibilities for the historical resources in these areas. Such resources are defined as those "possessing historical, cultural, archaeological, or paleontological significance, including sites, structures, districts, and objects significantly associated with or representative of earlier people, cultures, and human activities and events" (15 CFR 922.2 (c)). In this action plan, the terms *historical resources*, *cultural resources*, and *submerged cultural resources (SCRs)* are used interchangeably. Within the nation's national marine sanctuaries, these resources include shipwrecks that are part of both U.S. and world history, as well as the remains of submerged prehistoric cultures. See FEIS Affected Environment Cultural and Historic Resources.

The Sanctuary's submerged cultural resources encompass a broad historical range. Because of the Keys' strategic location on early European shipping routes, the area's shipwrecks reflect the history of the entire period of discovery and colonization. This richness of historical resources brings a corresponding responsibility for protecting resources of national and international interest. Accordingly, the resources should be managed for public benefit and enjoyment, while the historical-cultural heritage is preserved for the future. Long-term protection requires a precautionary approach to historical resource management, particularly when cultural information and/or the artifacts may be destroyed or lost intentionally or unintentionally through various direct and indirect activities. The Federal Archaeological Program or equivalent standards of conservation, cataloguing, display, curation, and publication must be assured before the excavation of historically significant resources is permitted. Such projects are expensive and labor-intensive, requiring specialists in the fields of archaeology, conservation, and museum work and historic shipwreck research and recovery. NOAA and the State will explore all public and private partnerships in fulfilling SCR management and will consider private sector implementation, if it is determined to be in the public's interest.

## General Policy

NOAA's primary policy is to protect sanctuary resources, including SCRs. NOAA must also manage the Sanctuary and its resources, including SCRs, to facilitate multiple uses of the Sanctuary which are determined to be compatible with resource protection. Compatible uses include research, education, recreation, fishing and other commercial uses. This Action Plan addresses the controversial issue of commercial treasure salvage. The Plan is the result of a long public process, including scoping meetings, workshops, and consideration of numerous and diverse public comments, including the Sanctuary

Table 20. Summary of Submerged Cultural Resources Strategies

Page	Strategies	Overall Sanctuary Priority Level	Planned Level of Action in Year One	Months to Complete	Funding for Full Implementation	Number of Activities to be Undertaken	Number of Institutions
175	R.1 SCR Management	Medium	Low	24	<50%	5	5



Advisory Council. In consultation with the State, which owns abandoned shipwrecks in 65% of the Sanctuary, and consistent with the Abandoned Shipwreck Act, commercial treasure salvage of abandoned shipwrecks has been determined not to be a compatible use in areas where there is coral, seagrass and other significant natural resources. However, in other areas relatively devoid of these significant natural resources, commercial treasure salvage will be permitted for objects of low to moderate historical significance, provided that the recording and reporting of recovery operations, as well as the curation of representative samples of artifacts are conducted consistent with the Programmatic Agreement for SCR Management, as well as Federal Archaeological Program (FAP) or equivalent standards. The FAP was developed by the National Park Service (NPS) by Presidential Order, and includes a collection of historical and archaeological resource protection laws to which Federal managers adhere. The National Historic Preservation Act (NHPA) requires Federal agencies to develop programs to inventory and evaluate cultural historic resources. Section 106 of the NHPA requires that each recovery permit be reviewed by the State Historic Preservation Office and the Advisory Council on Historic Preservation. Permits within the scope, and which adhere to all of the provisions of the Programmatic Agreement for SCR Management, need not go through additional NHPA 106 process.

The Abandoned Shipwreck Act (ASA) requires that a state's management practices protect shipwrecks, natural resources, and habitat areas, and guarantee recreational access to shipwreck sites. The ASA Guidelines prohibiting commercial salvage in marine sanctuaries are being followed in zoned areas, and in areas where there is coral, seagrass and other significant natural resources. Commercial salvage will only be permitted for objects of low to moderate historical significance in areas relatively devoid of significant natural resources. There will be no commercial salvage of SCRs of high historical significance. The ASA also provides for private-sector recovery conducted in an archaeologically- and environmentally- sound manner. Thus, SCR management will also preserve selected shipwrecks in the Sanctuary for research and recreation purposes. Other shipwrecks may be more appropriate for recovery and preservation in museums with public access. Finally, the plan provides for the dispersal of certain recovered resources to private parties. Private profit is available through public display, as well as from the sale of gold, silver, jewels, and other objects of little or no historical significance after proper archaeological recording, analysis and

reporting. The Programmatic Agreement for SCR Management provides further details on the criteria, and process for decisions on which SCRs should be preserved in situ and which SCRs would be considered permissible for recovery.

**How the Plan is Organized.** This action plan outlines the proposed approach for developing and implementing a program to manage submerged cultural resources in the Sanctuary. The plan is composed of the SCR Management strategy (R.1), and includes its component activities and subactivities. It is organized into three sections: an introduction, a description of strategies, and a discussion of implementation procedures.

## **Background**

**Management Strategies.** Each strategy has been assigned an estimated "activity level" for year 1 (high, medium, low, or none). This activity level is an estimation of the planned level of action that will occur in the first year after the Sanctuary Management Plan is adopted. In addition, the time required, costs of implementation, and funding availability (Federal, State, local, and private) have been estimated for all strategies. The component activities within each strategy, and the institutions responsible for implementing them, have been identified.

The strategies for the Management Plan, which includes the Submerged Cultural Resources Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**SCR Strategies.** The SCR Management strategy is in the medium priority level. It is an important strategy, as it forms the basis of the Sanctuary's Submerged Cultural Resources Program. It is composed of five activities: 1) SCR protection and management; 2) establish SCR inventory; 3) SCR research and education; 4) ensure permit compliance

### Existing Programs

The Division of Historical Resources (Florida Department of State) has conducted an archaeological field school; participated in archaeological sport diving workshops; established the San Pedro Underwater Archaeological Preserve; granted permits for archaeological inventories in the Upper and Middle Keys; and cooperated with other agencies in permitting and law enforcement activities. Before the Sanctuary was established, the Division granted contracts to search for and recover artifacts from historic shipwreck sites in State waters. Many of these activities will continue, and some will be expanded within this program.

In addition, NOAA's National Marine Sanctuary Program has managed the submerged cultural resources at the Key Largo, Looe Key, and Florida Keys national marine sanctuaries in a manner consistent with the provisions of the Federal Archaeological Program. Projects conducted to date include remote sensing studies, literature searches, and limited field research and recovery by private groups under permits. Within these sanctuaries, submerged cultural resource management has encouraged public access, research, education, and recreation consistent with the goals of site protection and conservation. These activities and others will be continued in the Florida Keys National Marine Sanctuary.

through enforcement, 5) ensure interagency coordination (Programmatic Agreement for SCR Management)

**Relationship to Other Action Plans** The SCR regulations are included in the Regulatory Action Plan. In addition, this plan relies on the implementation of the Enforcement Action Plan, the Education Action Plan, and other action plans.

within its boundaries for current users and future generations. Because cultural resources are nonrenewable, decisions affecting these resources must be made with a precautionary approach, and only after careful and deliberate analyses of the potential consequences on long-term preservation.

The goals of the Florida Keys National Marine Sanctuary's Submerged Cultural Resources Program are to

### Goals and Objectives

**National Goals** The national goals of the Submerged Cultural Resources Management Program are to

- protect SCRs and facilitate multiple uses compatible with resources protection, including the provision of access for recreation, research, education and compatible commercial uses,
- provide information for the conservation and management of submerged cultural resources in national marine sanctuaries and national estuarine research reserves,
- conduct, promote, and coordinate research and monitoring of submerged cultural resources in the nation's sanctuaries and reserves; and
- enhance public awareness and education programs through the study of cultural resources in the nation's sanctuaries and reserves

**Sanctuary Goals.** The Sanctuary has a trustee responsibility for protecting the cultural resources

- gather sufficient information about the nature and extent of the area's cultural resources to allow managers to make informed decisions about resource protection and management,
- interpret the history and culture of the Keys for the public,
- allow/permit private-sector participation research, documentation, recovery, and curation of cultural resources, and
- to develop a community-based stewardship for cultural resources in the Sanctuary

**Sanctuary Objectives.** To achieve these goals, the following objectives should be accomplished in a reasonable and cost effective manner

- inventory the Sanctuary's submerged cultural resources in a manner consistent with Federal requirements and standards,
- provide a resource database to fully inform managers and the public about the area's submerged cultural resources to the extent consistent with public resource protection and business confidentiality,

#### *Action Plans: Submerged Cultural Resources*

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- interpret the Sanctuary's submerged cultural resources for the public through on-site and land-based exhibits and accompanying materials such as brochures and videos;
- develop public partnerships for the research, interpretation, and management of submerged cultural resources; and
- foster and enhance a stewardship ethic for cultural resources among Sanctuary users.

The activities within the Submerged Cultural Resources Management strategy represent the initial stages of the Sanctuary's Cultural Resources Management Program.

## Description of Strategies

### Strategy R.1: SCR Management

Develop and implement a program to protect and manage submerged cultural resources consistent with the NMSA, the ASA and Federal Archaeological Program standards through regulations, permits, education, and research. Inventory submerged cultural resources and assess survey and extraction techniques within the Sanctuary. Require permitting throughout the Sanctuary. However, no permits will be issued for salvage or recovery in sensitive areas; i.e., Sanctuary Preservation Areas, Ecological Reserves, Wildlife Management Areas, Existing Management Areas, and other areas where there is coral, seagrass or other significant natural resources. No commercial salvage will be permitted for sites of high historical significance.

*(Priority Level Medium, Low Level of Action in Year 1, ongoing)*

**Activity 1 SCR Protection and Management.** The Sanctuary regulations, ASA guidelines, and FAP standards/practices have been developed to address the survey, research, recovery, and dispensation of certain objects, and will be implemented consistent with Federal and State archaeological policies. Additional Sanctuary guidelines, as well as site-specific management plans, including zoning, may be developed based on the significance of the SCR and the need for protection and managed access. The development of Sanctuary specific archaeological guidelines and model permits is also being considered. The establishment of an Advisory Committee for SCR management consistent with the ASA guidelines will also be considered.

In order to protect SCRs, removal without a permit is prohibited. Non-intrusive access is not prohibited and does not require a permit. To facilitate access and multiple use, and ensure it's compatible with resource protection, there is a sanctuary permit system. Private recovery may occur under a Sanctuary permit. The decision of whether to grant such permits will be based upon a balancing of the public's interest using criteria in the regulations for all permits, as well as the factors and criteria set forth in the regulations for SCR permits which are further detailed in the SCR Agreement. The site's historical/cultural value and significance, its recreational value, the potential

environmental impact of the proposed activity, the professional qualifications of the applicants, the proposed methods of research/recovery/conservation, and the public benefits of the proposed activity are some of the factors considered by NOAA, in consultation with the State.

Applications that provide for conservation of SCRs in museums or similar structures of public access for research, education, or public viewing enjoyment will be given priority over applications where some of the objects are dispersed. When the applicant plans to disperse objects in the private market, disposition of artifacts will be considered on a case-by-case basis consistent with ASA guidelines, and with the SCR Agreement. Where the applicant has arranged for private conservation, long-term public display, guaranteed public access, and public interpretation of artifacts and data, the disposition of objects may be adjusted accordingly. Proposals where the entire collection will be conserved in private museums, but the SCRs will be readily available for research and public access, will be encouraged. No permits will be issued for excavation in areas where coral, seagrass meadows, or other significant natural habitats exist.

The Sanctuary Program requires permits for the conduct of activities prohibited by sanctuary regulations, or that otherwise may adversely affect Sanctuary resources. Such permits may only be granted in accordance with existing law and Sanctuary policies. NOAA encourages Sanctuary uses that do not adversely affect Sanctuary resources (including archaeological information) or interfere with other Sanctuary uses. A survey and inventory permit is not required for remote sensing activities, but one will generally be required before considering the issuance of a research and recovery permit. One of the factors considered in granting a research and recovery permit is whether the applicant demonstrated his or her professional and scientific abilities in the survey-inventory permit. An archaeological research/recovery permit is necessary for the removal of historical resources. The historic resources must be maintained in a museum or similar institution where public access for research, education and viewing enjoyment is provided. A deaccession /transfer permit is required to privatize the public resources recovered under a research/recovery permit. The deaccession/transfer permits shall also be subject to the requirements for special-use permits. Such removal of the public's sanctuary resources requires a substantial justification of public interest, consistent with the purposes and policies of the Sanctuary as set forth in the SCR Agreement and the ASA guidelines. All permits are evaluated based on a variety of

factors, including potential environmental and cultural resource impacts.

■ **Implementation.** NOAA's Sanctuary Program, FDHR, and legal staff have worked together to develop a framework for SCR management of submerged lands within the Sanctuary consistent with the NMSA, the ASA guidelines, and State law.

■ **Schedule.** The regulations, SCR Agreement and some of the guidelines have been completed. Subsequent guidelines, model permits, and other activities discussed below will be considered. This activity will have a high level of action in year 1. It will require 12+ months to complete.

**Subactivity 1-Create an SCR Field Unit.** A field unit will be established to conduct field research and coordinate permitted research activities.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity. The FDHR will provide assistance.

■ **Schedule.** This subactivity will have a high level of action in year 1. Depending on funding, it may require 6 months to a year or more to complete. Contracting archaeological services in the field is being considered as an interim measure.

**Subactivity 2-Monitoring For SCR Site Degradation.** Will seek long-term monitoring of selected SCR sites to determine whether environmental conditions and human use affect site integrity.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity. The FDHR will provide assistance.

■ **Schedule** - This subactivity will have a low level of action for year 1. It will be on-going.

**Activity 2 - Establish SCR Inventory.** Compile existing literature into a computerized bibliographic database. Survey and identify site locations and specific site characteristics including name, age, integrity, and historical and cultural significance. Compile an electronic database of site information.

■ **Existing Program Implementation.** NOAA, the Florida Division of Historical Resources (FDHR), and nonprofit organizations have completed some survey and inventory activities. Together they have compiled and organized data on the location, identity, and significance of certain historical shipwrecks. The

Cultural and Historic Resources section of the Description of the Affected Environment chapter (Volume II) should be consulted for additional information. The SCRs currently identified, as well as those to be discovered, will be protected and managed in accordance with the Plan and regulations.

■ **Implementation.** NOAA will be the lead agency responsible for establishing a cultural resources inventory for the Sanctuary. This effort will build on existing work by the State and others. The NPS, Florida Department of Environmental Protection (FDEP), and FDHR will provide assistance in implementing the components of this activity.

■ **Schedule.** The inventory of all SCRs is a long-term management goal and the activity will be conducted in a continuous manner until completed.

**Subactivities.** Implementing this activity will depend on several subactivities that will help generate the information for inclusion in the inventory:

**Subactivity 1-Use SCR Information Developed in Permits, Authorizations or Certifications.** The regulations prohibit the conduct of certain activities in the Sanctuary. Part of the permit process generally includes assessment of the natural and cultural resources in the area under permit consideration. In addition, the Plan provides for public and private surveys and inventories of SCRs.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity in consultation with the FDHR.

■ **Schedule.** This subactivity will have a medium level of action in year 1. This subactivity will be continuous.

**Subactivity 2-Survey and Collect Anecdotal Information.** The community knowledge base will be tapped through surveys of fishermen, treasure hunters, and others with local knowledge; a program of professional/amateur public participation will be developed. This information will be incorporated into the cultural resource inventory.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity. The FDEP and FDHR will provide assistance.

■ **Schedule.** This subactivity will have a high level of action in year 1. It will require 12 months to complete.

**Subactivity 3-Utilize Volunteer Assistance in Cultural Resources Inventory.** The Sanctuary's volunteer coordinator, using local volunteers, will assist Sanctuary staff in collecting existing information; locating unrecorded sites; recording and documenting sites; assessing site significance; and developing sites for improved public access, interpretation, and protection (see the Volunteer Action Plan).

■ **Implementation.** The Sanctuary's volunteer coordinator will implement this subactivity. The NPS and FDHR will provide assistance.

■ **Schedule.** This subactivity will have a high level of action in year 1. It will require six months to complete.

**Subactivity 4-Public Participation Projects Inventory.** Submerged cultural resources inventory projects will be conducted by research and educational institutions (using local volunteers). The objective is to involve the public in the inventory phase of Sanctuary archaeological investigations.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity. The FDHR will provide assistance.

■ **Schedule.** This subactivity will have a low level of action in year 1. It will be continuous.

**Subactivity 5-Develop a Site Database.** A central database of all shipwreck information will be maintained by the Sanctuary, in cooperation with the Florida Site File at the FDHR. Projects will be designed that are appropriate for grant funding by the FDHR, the Coastal Zone Management Program, and other sources. The data collected for non-sensitive sites may also be incorporated with other geological, biological, and census data into a geographic information system (GIS) that will be used to analyze relationships between these resources, and to facilitate their management.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity. The NPS, FDEP, and FDHR will provide assistance.

■ **Schedule.** This subactivity will have a medium level of action in year 1. It will be continuous.

### **Activity 3 - SCR Research and Education**

**Subactivity 1-Develop a Scientific Research Study Program.** The Sanctuary Program will encourage and coordinate scientific studies by recognized research

groups and institutions. This information will enhance the existing knowledge base on submerged cultural resources in the Keys.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity. The NPS will provide primary support. The FDEP, FDHR, and the State Historic Preservation Officer (SHPO) will provide assistance.

■ **Schedule.** This subactivity will have a medium level of action in year 1. This subactivity will be continuous.

**Subactivities.** The activity is composed of several subactivities. First, a series of public workshops will be held to identify topics and projects of community interest. Second, a volunteer training program will be established to provide a mechanism for general public involvement in SCR research. Third, Sanctuary staff will coordinate with university field schools to generate research projects and facilitate public involvement. Fourth, Sanctuary staff will apply appropriate management tools, such as scientific investigation, underwater "parks," or a field school, to specific sites to provide basic knowledge of the resource. Finally, an interpretive exhibit of the archaeological sites and their historic context will be developed to provide information to the community at large.

**Subactivity 1-Public Participation Projects Management.** A series of projects will be developed that are designed to involve the public in the long-term management of SCRs and promote stewardship through public involvement.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this subactivity. The FDHR will provide assistance.

■ **Schedule.** This subactivity will have a low level of action in year 1. It will be continuous.

**Subactivity 2-Volunteer Training Program.** A volunteer training program will be established to provide a mechanism for general public involvement in SCR research, documentation, and management.

■ **Implementation.** The Sanctuary's volunteer coordinator will be responsible for implementing this subactivity. The NPS and FDHR will provide assistance.

■ **Schedule.** This subactivity will have a low level of action in year 1. It will require 12 months to complete.

**Subactivity 3-Coordinate with University Field Schools.** Archaeological research in the Sanctuary will be facilitated by providing scientific, logistical, and other support.

■ **Implementation.** NOAA and the FDHR will be the lead agencies responsible for implementing this subactivity. The FDEP will provide assistance.

■ **Schedule.** This subactivity will have a medium level of action in year 1. It will be continuous.

**Subactivity 4-Develop a "Shipwreck Trail."** By selecting and interpreting a selection of shipwrecks, a "shipwreck trail" will be developed to provide an on-water and on-land interpretive exhibit for the public.

■ **Implementation.** The FDHR will be the lead agency responsible for implementing this subactivity. NOAA and the NPS will provide assistance.

■ **Schedule.** This subactivity will have a low level of action in year 1. It will require 12 months to complete.

**Subactivity 5-Develop an Interpretive Exhibit.** An interpretive exhibit of the archaeological sites and their historic context will be developed to provide the public with information about SCRs in the Sanctuary.

■ **Implementation.** The FDHR will be the lead agency responsible for implementing this subactivity. NOAA and the NPS will provide assistance.

■ **Schedule.** This subactivity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 4-Ensure Permit Compliance through Enforcement.** Ensure compliance with statutes, rules, Sanctuary regulations, and permits through intensive on-site patrols by authorized law enforcement officers.

■ **Existing Program Implementation.** Within the Key Largo and Looe Key national marine sanctuaries, Federal laws and regulations are enforced by State officers cross-deputized with Federal authority. Within the State territorial boundary, State laws and regulations are enforced by the Florida Marine Patrol.

■ **Implementation.** NOAA, the State of Florida, and other agencies will be cross-deputized with Sanctuary law enforcement authority. Sanctuary and other pertinent regulations and laws will be enforced jointly, with an emphasis on public education as a tool for compliance (see the Enforcement Action Plan).

Officers will receive training to facilitate this interpretive role (see the Education Action Plan).

■ **Schedule.** This activity will have a high level of action in year 1. It will require 24 months to complete.

**Subactivities.** There are two subactivities within Activity 4: 1) cross-deputization; and 2) an SCR training program.

**Subactivity 1-Cross-deputize Law Enforcement Officers.** This is described in the Cross-deputization strategy (B.12) within the Enforcement Action Plan.

**Subactivity 2-Develop an SCR Educational Program for Law Enforcement Personnel.** This program will be part of a standardized training program for cross-deputized enforcement agencies. The training program is included in the Training/Workshops/School Programs strategy (E.4) within the Education Action Plan.

**Activity 5-Ensure Interagency Coordination.** Ensure comprehensive coordination among all appropriate Federal, State, and local agencies involved in, and responsible for, the management of SCRs through the implementation of the SCR Agreement.

■ **Existing Program Implementation.** Within the Key Largo and Looe Key national marine sanctuaries, no coordination between NOAA and the FDHR is required, as these are Federal waters and the State lacks jurisdiction. However, the two agencies cooperate by sharing information, advice, equipment, and staff. In addition, the two agencies have developed a close working relationship in State-owned portions of the Sanctuary, where the Division holds title to abandoned SCRs and NOAA has a management responsibility as a co-trustee.

■ **Implementation.** NOAA and the FDHR will enter into the proposed MOU (as recommended in the Abandoned Shipwreck Act) covering the management of SCRs within the Sanctuary. The terms of the MOU, as well as components of the final Management Plan, specify the responsibilities and roles of various parties to ensure the timely and effective coordination of activities involving SCRs.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 12 months to complete.

## Implementation

**This section explains how the SCR Action Plan will be implemented. The institutions responsible for each activity, including subactivities, as well as those agencies that will provide some level of implementation assistance, are identified. The planned level of activity in year 1, months required to complete, funding availability, cost estimate, staff and equipment requirements, and geographic focus for each activity and subactivity are provided. Contingencies for a changing budget are also discussed. Finally, the process used to evaluate the effectiveness of the SCR Management Program as it evolves over time is provided.**

**Responsible Institutions.** NOAA and the FDHR are the agencies primarily responsible for implementing the SCR Management Plan. NOAA and the State of Florida will jointly manage Sanctuary resources, while the Division will retain title to abandoned shipwrecks on State-owned submerged lands. If excavation is involved, permission may also be required from the FDEP (e.g., dredge and fill permit and consent to use State lands) and the U.S. Army Corps of Engineers (e.g., dredge and fill permit), depending on location of site. Table 21 lists the responsible institutions and their level of responsibility in each activity.

The DHR, through its Bureau of Archaeological Research, has developed a range of SCR management tools that can be usefully applied within the Sanctuary. The Division's role, although sometimes regulatory, typically involves management activities such as inventory, assessment, research, education, public interpretation, and grant assistance for historic preservation projects.

NOAA's primary role will be to protect SCRs through the permitting program and enforcement, as well as to provide overall policy direction and coordinate research by outside institutions and individuals. In this capacity, NOAA will ensure that research is well-designed and consistent with Sanctuary Program policies. NOAA will also work with the State to inventory Sanctuary resources in a manner consistent with the Federal archaeological program and the ASA guidelines.

**Prioritization.** Each subactivity included in this plan is ranked as either high, medium, or low priority. The ranking signifies the level of importance of each subactivity, and provides guidance for the timing of

implementation. The priority levels should not be compared across activities. They only indicate the relative importance of the subactivities contained within an activity.

**Schedule.** Table 22 lists the estimated time required for the implementation of each activity and subactivity included in the SCR Action Plan. The number of months required to complete each activity and subactivity is also provided.

**Cost.** The estimated cost of implementing each activity is shown in Table 22. The costs represent the sum of Sanctuary staff salaries; equipment and supplies; services; and other requirements necessary for implementation. Because each activity must be addressed independently, costs were calculated in a similar manner and cannot be totalled down the column. Costs are divided into total capital cost, and annual operations and maintenance cost.

Table 21. Agencies Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies				
	NOAA-Sanctuary	NPS	FDEP	FDHR	SHPO
<b>R.1 SCR MANAGEMENT</b>					
<b>Activity 1. SCR Protection and Management</b>					
Create an SCR Field Unit	●			○	
Monitoring for SCR Site Degradation	●			○	
<b>Activity 2. Establish SCR Inventory</b>	●	○	○	○	
Use SCR Information Developed in Permits, Authorizations or Certifications	●			○	
Survey and Collect Anecdotal Information	●		○	○	
Utilize Volunteer Assistance in Cultural Resources Inventory	●	○		○	
Public Participation Projects Inventory	●			○	
Develop a Site Database	●	○	○	○	
<b>Activity 3. SCR Research and Education</b>	●		○	○	○
Develop Scientific Research Study Program	●	○	○	○	
Public Participation Projects Management	●			○	
Volunteer Training Program	●	○		○	
Coordinate With University Field Schools	●		○	○	
Develop a "Shipwreck Trail"	○	○		●	
Develop an Interpretive Exhibit	○	○		●	
<b>Activity 4. Ensure Permit Compliance through Enforcement</b>					
Cross-deputization of Law Enforcement Officers					Refer to Enforcement Action Plan
Develop SCR Educational Program for Law Enforcement Personnel					Refer to Education Action Plan
<b>Activity 5. Ensure Interagency Coordination</b>	●	○	○	○	

● Lead    ○ Primary Role    ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; NPS, National Park Service; FDEP, Florida Department of Environmental Protection; FDHR, Florida Division of Historical Resources; SHPO, State Historic Preservation Officer.



## Action Plans: Submerged Cultural Resources

As no active archaeology studies are currently being conducted at either the Key Largo or Looe Key national marine sanctuaries, no cost figures are available to project base FKNMS cost figures. Therefore, all cost figures are estimates based on NPS projects, State projects, and contractor quotes for jobs of similar specification.

**Geographic Focus.** Although SCRs may be discovered anywhere in the Sanctuary, there are areas of known concentration and high probability. These are in shallow water, especially in proximity to shipping routes, on and near reefs, in historically used channels, and near historical sources of freshwater. Management will focus on selected shipwreck sites, with the particular characteristics of a site determining the types of management tools needed. "High-probability" areas must be delineated, but only after

more data is collected, and a comprehensive inventory of submerged cultural resources is completed.

**Personnel.** Three staff members are necessary to implement the activities outlined in this plan. Core personnel will include an archaeologist and two trained archaeological technicians. Two additional personnel may be required for oversight of special-use permits that allow the sale or dispensation of some gold, silver, and jewels. The archaeologist position will probably be at the GS-11/13 level (approximately \$30,000 to \$45,000 annually). The secondary support staff will most likely be at the GS-7/9 level (approximately \$20,000 to \$25,000 annually).

**Equipment.** To ensure the success of the SCR Management Plan, sufficient equipment will be

Table 22. Requirements for Implementation

Strategy/Activity	Overall Sanctuary Priority Level	Implementation			Cost to Complete		Geographic Focus
		Planned Level of Action in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/Maintenance (\$1,000)	
<b>R-1 SCR MANAGEMENT</b>	Medium	Low	24	<50%	100-999	100-999	
<b>Activity 1. SCR Protection and Management</b>	High	High	18+	<50%	100-999	100-999	
Create an SCR Field Unit	High	High	6	<50%	10-99	10-99	SW
Monitoring for SCR Site Degradation	High	Low	6	<50%	10-99	10-99	SW
<b>Activity 2. Establish SCR Inventory</b>	High	High	12+	<60%	10-99	10-99	
Use SCR Information Developed in Permits Authorizations or Certifications	Low	Low	C	<50%	<10	<10	SW
Survey and Collect Anecdotal Information	Low	Low	12	<50%	<10	<10	SW
Utilize Volunteer Assistance in Cultural Resources Inventory	Low	Medium	C	<50%	<10	<10	SW
Public Participation Projects Inventory	Low	Low	12	<50%	<10	<10	SW
Develop a Site Database	Low	Low	12	<50%	<10	<10	SW
<b>Activity 3. SCR Research and Education</b>	High	High	18	<50%		10-99	
Develop a Scientific Research Study Program		Medium					
Public Participation Projects Management		Low					
Volunteer Training Program		Low					
Coordinate With University Field Schools		Medium					
Develop a "Shipwreck Trail"		Low					
Develop an Interpretive Exhibit		Low					
<b>Activity 4. Ensure Permit Compliance through Enforcement</b>							
Cross-deputization of Law Enforcement Officers		Refer to Enforcement Action Plan					
Develop SCR Educational Program for Law Enforcement Personnel		Refer to Education Action Plan					
<b>Activity 5. Ensure Interagency Coordination</b>	High	High	12	<50%		<10	SW

Abbreviations: SW, Sanctuary-wide.

Note: The priority levels for subactivities should not be compared across activities—they only represent the relative importance of activities contained within a strategy.

required so sites can be reached and investigated in a reasonable response time. Such equipment would include a boat and trailer for use throughout the Sanctuary. Standard safety and diving gear should be complemented by surveying, remote sensing, position-finding, and shallow-excavation equipment, as well as the archaeological equipment necessary for underwater recording and recovery activities. Although the quantity and capability of equipment will vary based on the tasks to be accomplished, a minimum inventory response capability should be maintained. The cost of this equipment, based on the use of a government surplus or seized vessel and medium-quality diving and surveying equipment, will be approximately \$100,000. This includes vessel refurbishment and maintenance costs. Two additional boats of approximately 20 feet in length may be required for oversight of private recovery operations. If government surplus vessels are used, an additional \$30,000 may be required to refurbish and outfit these vessels, and an additional \$10,000 will be required for surveying, diving, and documentation equipment.

Computer equipment, video and photographic cameras, and drafting equipment will also be required. This equipment (plus the basic office equipment for a staff of three) could cost as much as \$100,000, depending on the level of technological sophistication. However, the bulk of this expenditure is a one-time outlay, and would not be required in subsequent years. The annual operating budget, including salaries, is expected to be \$140,000.

**Contingency Planning for a Changing Budget.** If funding is below projected levels, cuts could be made in staffing and equipment purchases. Part-time positions within the private recovery supervision program could potentially be filled by other staff members after the fulfillment of a rudimentary training program in archaeological methods. An observer may be required on private recovery vessels at all times to ensure compliance with Sanctuary regulations and permit conditions. One of the two core staff technicians could be shared with the biology/damage assessment staff, as both positions require underwater mapping and other documentation skills.

In addition, costs for remote sensing equipment could be reduced or eliminated by hiring contractors to complete this work. However, an in-house capability is more desirable, as contracted work may be slowed by the competitive bidding process, and the fact that jobs may be grouped together to make the most efficient use of the contractor's time.

**Evaluating Program Effectiveness.** The best method of evaluating Program effectiveness is to measure accomplishments against the stated goals and objectives. This will be done in-house and with a review interval that is proportional to the complexity of the tasks undertaken. Examples of items to be evaluated include: the number of participants engaged in volunteer programs; the number of field schools conducted; the number of school programs and public exhibits; and the number of presentations given to external groups.

Another means of assessing the SCR Management Program is through a review committee of qualified archaeologists. The "peer review" principle is well-established in academia, and can be applied to the cultural resources program at little or no cost. The review committee would consist of archaeologists with graduate training in archaeology, relevant experience, and/or a track record of scholarly publication. The quality of work produced during the evaluation period would be emphasized, with particular attention paid to the reports generated both within the program and by permit holders. The committee would also evaluate site protection, paying particular attention to the Sanctuary's legislative mandate and how effectively it has been fulfilled during the review period.

In addition, the data collected during the previous year would be inventoried, and data would be checked for consistency and veracity. Consistency would be measured across projects, and site plans, remote sensing data, and photo documentation would be compared to ensure uniformity. Data veracity would be checked by selecting projects at random and attempting to duplicate the results. Examples could include duplicating (on a limited scale) remote sensing runs and verifying submitted site maps. If serious discrepancies are found, the quality assurance aspects of the program would be reevaluated.

The final tangible measure of the Program will be a review of the publications generated during the five-year duration of the initial Sanctuary Management Plan. This is critical to ensure that the program fulfills its role within the professional community.

## **Programmatic Agreement for SCR Management Among NOAA, The Advisory Council on Historic Preservation, and the State of Florida**

The Florida Keys National Marine Sanctuary (Sanctuary) was established to provide comprehensive protection to the marine environment in the Florida Keys and comprehensive management of the use of the Sanctuary and its resources, including historical resources.

The Secretary of Commerce, through the National Oceanic and Atmospheric Administration (NOAA) and in consultation with the State of Florida, developed a comprehensive management plan which facilitates multiple use of the Sanctuary resources consistent with the primary objective of resource protection.

The purpose of this Programmatic Agreement is to jointly develop a policy for the protection and management of historic resources in the Florida Keys National Marine Sanctuary by the Co-Trustees, the State of Florida, and NOAA that the Advisory Council on Historic Resources (Council) agrees is in compliance with sections 106 and 110 of the National Historic Preservation Act (NHPA).

Management and protection of the historic resources in the Florida Keys National Marine Sanctuary shall be administered in accordance with the Florida Keys National Marine Sanctuary Protection Act (FKNMSPA), the National Marine Sanctuaries Act (NMSA), and the Abandoned Shipwreck Act (ASA). Management actions consistent with this agreement would satisfy NOAA's Section 106 responsibility for all individual undertakings affecting the historic resources within the Florida Keys National Marine Sanctuary. The SCR Agreement also addresses NOAA's Section 110 inventory responsibilities.

### **I. References and Authorities**

The Sanctuary was established under the Florida Keys National Marine Sanctuary and Protection Act, Public Law No. 101-605, 104 Stat. 3089 (Nov. 16, 1990). Section 5(a) of the FKNMSPA expressly provides that the Florida Keys National Marine Sanctuary be managed under all applicable provisions of the NMSA, as amended, 16 U.S.C. 1431 *et seq.* NOAA enters into this Agreement pursuant to the FKNMSPA and the NMSA.

The Abandoned Shipwreck Act, 43 U.S.C. 2101-2106, transferred title to abandoned shipwrecks on states' submerged lands to the states. Under the ASA, states are to manage the abandoned shipwrecks in a manner which protects shipwreck sites, guarantees public access to divers and others, and allows for appropriate public- and private-sector recovery of shipwrecks consistent with the protection of historical values and environmental integrity of the shipwrecks and sites. The State of Florida enters this Agreement pursuant to Chapter 267 of the Florida Statutes, in which title to abandoned historic resources on state-owned or state-owned sovereignty submerged lands is vested in the Division of Historical Resources of the Florida Department of State for the purposes of administration and protection.

The designation of the Sanctuary does not alter the State of Florida's title to abandoned shipwrecks on State submerged lands. However, upon designation NOAA and the State share co-trustee responsibilities for natural and historic resources within the State portions of the Florida Keys National Marine Sanctuary.

The Abandoned Shipwreck Act Guidelines, 55 Fed. Reg. 50116 (December 4, 1990; ASA Guidelines), provide advice to the states and Federal agencies on how to effectively manage abandoned shipwrecks on submerged lands under their ownership or control. The ASA Guidelines provide for private-sector participation in shipwreck research projects and recovery of shipwrecks when such activities are in the public interest.

### **II. Definitions**

*Archeological Recovery* - A process of systematic artifact recovery and mapping of shipwreck sites.

*Artifact* - an object made or manipulated by man. Artifacts commonly found at archaeological sites may have one or more of the following qualities:

1. Historic - an object associated with historical events;
2. Aesthetic - a work of art or craft;
3. Religious - iconic, ceremonial;
4. Functional - a tool, utensil, etc.;
5. Modified Commodity;

6. Food Product Used for Subsistence - butchered animal bones, seeds, corn cobs, etc.

*Artifact Scatter Pattern* - The stratigraphic and horizontal distribution of scattered artifacts, ballast deposits, and ship remains which archaeologically indicate the events (e.g., the wrecking of a vessel; natural occurrences such as currents or storms; salvage activities; and/or other processes) surrounding the sinking and progressive disintegration of a shipwreck site.

*Commercial Salvage* - the search for and recovery of shipwrecks and/or artifacts using archaeological recovery techniques and historical documentation to maximize the intrinsic value of the finds. It is to be distinguished from treasure hunting, which involves recovery without regard for archaeological context and historical significance.

*Crafted Items* - materials made of metals, stones, or other materials that have functional, aesthetic, cultural, historical, or religious significance or value.

*Debris Field* - an area of artifacts that were scattered and deposited through: 1) the wrecking or sinking of a vessel; 2) natural occurrences such as currents or storms; 3) salvage activities; and 4) other processes.

*Duplicative Artifacts* - a group of artifacts that are similar or identical in nature.

*Historical* - possessing historical, cultural, archaeological, or paleontological significance, including sites, structures, districts, and objects significantly associated with or representative of earlier people, cultures, and human activities, and events.

*Historical Association* - the interrelationship of discovered objects to one another and to their surrounding environment, and which provides the cultural context of the site.

*Historical Interest* - capable of providing scientific or humanistic understandings of past human behavior, cultural adaptation, and related topics through the application of scientific and scholarly techniques such as controlled collection, analysis, interpretation, and explanation.

*Historic Resource* - any material remains of human life or activities which are at least 50 years of age and which are of historical interest.

*Identical Artifacts* - artifacts made of identical material, of same content and weight, made in the same

mold, having the same marks, stamps, designs. They are often manufactured assembly style with machinery.

*In Situ* - A Latin term meaning "in the original position."

*Material Remains* - physical evidence of human habitation, occupation, use or activity, including the site, location or context in which such evidence is situated

*Modified Raw Materials* - commodities that have been reduced to a concentrated state. Such items indicate cultural activity in the shape, size, markings, and content of the artifact. This includes ingots, pigs, and bullion.

*Primary Archeological Deposit* - a shipwreck artifact assemblage stabilized by in-situ ballast, hull structure and overlying bottom deposits, or a combination thereof, which defines the original location and orientation of the bulk of a historic shipwreck's material remains. These deposits represent non-random distribution patterns that include personal effects, cargo, and ship's supplies reflecting human behavior in different shipboard activity areas.

*Raw Materials* - commodities that are in a natural state save for marks from cutting, breaking, or separating for transport. Such items are of historical interest due to tool marks, use and wear marks or patterns, size breakdown for transport, metal, or mineral composition.

*Secondary Archeological Deposit* - scattered artifacts derived from the break-up of a vessel following its sinking and progressive break-up of the hull under prevailing local hydrological conditions. The contextual associations within these derived artifacts are largely determined by oceanographic variables (wind, waves and currents) within a short time following the sinking of the vessel.

*Similar Artifacts* - artifacts made from the same materials for the same functional purpose. These artifacts may vary slightly in composition, weight, size, stamps and marks, wear patterns, color, design, etc. These may often be items made by handcraft.

*Tertiary Archeological Deposit* - artifacts transported from their original position on the sea floor through continual re-deposition within the regular erosion sedimentation cycle characteristic of shallow off-shore coastal processes.

### **III. Management of Historic Sanctuary Resources**

NOAA and the State of Florida agree that the comprehensive management plan for the Florida Keys National Marine Sanctuary should have uniform policies and regulations for the management of resources throughout the Sanctuary which are consistent with the provisions of the NMSA, the ASA, and the ASA Guidelines. The Sanctuary will be managed to protect natural and historical resources, including abandoned shipwrecks, for present and future generations. The management will also facilitate access for research, education, and recreational enjoyment in a manner which is consistent with the primary objective of resource protection.

The management plan for the Florida Keys National Marine Sanctuary does not terminate valid Federal admiralty rights to certain shipwrecks that were in existence prior to the designation of the Sanctuary by Congress on November 16, 1990, pursuant to valid orders of Federal Admiralty Courts.

#### **A. Inventory and Documentation of Historical Shipwrecks**

1. The survey and inventory of SCRs, including historical shipwrecks, is necessary for proper SCR management and is required under Section 110 of the NHPA. NOAA and the State of Florida will seek all appropriate public and private means of continuing to survey the FKNMS and prepare a shipwreck inventory of all known shipwrecks and other SCR sites within the Sanctuary.

2. Information obtained from literary research, survey and research permit reports, site maps and photographs shall be used to supplement the shipwreck inventory. The shipwreck inventory will provide a database to aid resource managers in proper management of historical resources within the FKNMS. All shipwrecks shall also be reported to the Florida Site File at the Florida Division of Historical Resources. The shipwreck inventory shall, at a minimum, contain the following information:

- a. Popular name and, when known, the vessel name, if different;
- b. Vessel size, type, and age;
- c. When known, the wreck date and function at the time of the wreck incident;

- d. Location, including whether it is in a zoned area or areas of coral, seagrass, or other natural/historical significance;
- e. The integrity and degree of dispersal of the shipwreck;
- f. Whether it is buried or encrusted in coralline formations;
- g. Whether it is listed in, or eligible for listing in, the National Register of Historic Places, or is eligible for listing as, or is, a National Historic Landmark;
- h. The site form recorded in the Florida Site File; and
- i. Whether the site is State-owned or subject to preexisting rights of access under admiralty law.

3. Any newly discovered shipwrecks or any new information pertaining to listed shipwrecks brought to the attention of NOAA or the State of Florida shall immediately be included in the shipwreck inventory and, where appropriate, the Florida Site File. NOAA and the State of Florida shall annually review the progress of the shipwreck inventory and shall make recommendations for the following year's work.

4. All information relating to each vessel including field notes, historical information, photographs, videotapes, site maps, drawings, inventory forms, and reports shall be maintained together and be deposited, when possible, in both the NOAA central repository and the Florida Site File. All such documentation shall be available to the public for interpretive and educational purposes.

#### **B. Resource Protection**

NOAA and the State of Florida agree that in order to protect natural and historic sanctuary resources, the Sanctuary regulations will prohibit the unauthorized removal or injury of historical resources and the unauthorized alteration of the seabed. Applications for permits involving activities which may injure historical resources will be reviewed by the State Historic Preservation Office, and NOAA. Permits which strictly adhere to the Sanctuary regulations, and this SCR Agreement, are also deemed to be in compliance with Section 106 of the National Historic Preservation Act, and do not require approval of the Advisory Council on Historic Preservation. Permits

which are outside of the scope of this SCR Agreement, in whole or in part, are subject to Section 106 review.

### **C. Public Access**

1. NOAA and the State of Florida agree to allow public access to historic resources which does not harm the natural or historic qualities of these resources. Sport divers shall have access to publicly owned shipwrecks having recreational value. Such access may be further facilitated through the placement of marker buoys and anchor moorings and through the distribution of information at dive shops and marinas.

2. NOAA and the State of Florida agree that generally, any person should be able to freely and without a permit dive on, photograph, or otherwise use and enjoy publicly owned shipwrecks, including historical shipwrecks and shipwrecks whose historical significance has not yet been evaluated, provided that the use or activity does not involve disturbing or removing parts or portions of the shipwreck, its immediate environment, coral, seagrass, and other natural resources.

3. NOAA and the State of Florida agree that there may be instances in which access to certain shipwrecks should be limited. Decisions to limit, monitor, or prohibit public access to shipwrecks shall be made on a case-by-case basis, be practical, and fairly administered. NOAA and the State of Florida may seek comments from various interested groups prior to imposing restrictions on public access to shipwrecks. Generally, public access to shipwrecks shall be regulated, including zoning, when:

- a. A shipwreck is extremely fragile and in danger of collapsing;
- b. A shipwreck is suffering extensive deterioration or attrition due to prior access;
- c. A permittee who is recovering a shipwreck under a valid permit requests that access be regulated during the term of the permit;
- d. A shipwreck site presents an unacceptable risk to human safety and the visitor does not assume full responsibility for his or her safety; or
- e. A shipwreck is subject to sovereign immunity and the applicable Federal government agency or foreign nation provides instruc-

tions on regulating public access to the shipwreck. In the absence of specific instructions from the applicable sovereign, under customary international law, access by any U.S. national to shipwrecks entitled to sovereign immunity is prohibited. When a sovereign grants permission, it generally limits access to named individuals for specified purposes. As a matter of policy, the U.S. Navy does not abandon its vessels, and permission is generally not given to access, or salvage, sunken Navy vessels.

4. NOAA and the State of Florida agree that public access to historical resources removed from the Sanctuary shall be maintained through curation and display agreements consistent to the maximum extent practicable with 36 CFR Part 79.

### **D. Education**

1. NOAA and the State of Florida agree that in order to responsibly manage historical resources in the FKNMS, a public education program shall be developed to facilitate the understanding of these resources, their significance in maritime history, and the importance of their preservation.

2. Public education will be facilitated through public workshops, field trips, volunteer projects.

3. NOAA and the State of Florida shall work toward establishing a system of underwater parks and underwater shipwreck trails where public access shall be encouraged. Recovery shall be prohibited in these areas.

4. The volunteer coordinator will develop an educational program for public volunteers to participate in gathering historical information for the shipwreck inventory.

5. To the extent practicable, recovered artifacts shall be placed in museums for public display and interpretation. Museums shall also develop interpretive programs that help illustrate the background and history of the recovered artifacts.

### **E. Permits**

1. NOAA and the State of Florida agree that non-intrusive surveys of historical resources are encouraged and will not require a survey/inventory permit. However, no archaeological research/recovery permit will be granted unless and until the applicant has gone through the survey/inventory process success-

fully or can otherwise demonstrate his or her professional abilities and that research/recovery is worthy of consideration by NOAA and the State.

2. Consistent with the policies of the National Marine Sanctuary Program and the Federal Archaeological Program, NOAA and the State of Florida prefer that SCRs are preserved *in situ*. Because historic resources are an irreplaceable non-renewable resource, they should remain in the sanctuary for research, education and the viewing enjoyment of the public for present and future generations, unless and until there is a substantial public interest justification for their removal.

3. Requests for the archaeological recovery of historic shipwrecks and their associated artifacts shall be jointly reviewed and approved by NOAA and the State of Florida in accordance with this agreement and the permitting procedures found in the FKNMSPA implementing regulations. Deaccession/transfer permits are for commercial salvage and have been determined to be Special-use permits, and are therefore also subject to the requirements and conditions for Special-use permits.

4. The proposed recovery activity must be in the public interest and should, at a minimum, further archaeological knowledge. For example, to facilitate research, education, public access and other management objectives for the FKNMS, the ASA, and the ASA Guidelines, decisions will be made on a case-by-case basis by weighing and balancing the values and uses a particular shipwreck may have, the potential benefits to be derived from the proposed recovery activity, and the potential adverse effects of the proposed recovery activity. Only those public and private sector recovery activities that are in the best interests of the public should be authorized. To help determine whether a proposed public or private sector activity is in the best interest of the public, in addition to the factors/criteria in the sanctuary regulations and elsewhere in this agreement, consistent with the ASA guidelines, NOAA and the State will also consider the following:

a) Is the SCR owned by the State; or is it subject to sovereign immunity or other sovereign interest, i.e., Florida, U.S., or Foreign government?

b) What are the SCR's current and potential value and uses? Is recovery consistent with those values and uses? Will it enhance those values and uses? Will it irrevocably damage or destroy any of those values and uses?

c) Is the SCR listed in, or eligible for, inclusion in the National Register of Historic Places? Is it a National Historic Landmark?

d) Will the proposed recovery result in a nomination to the Secretary of Interior to list the SCR in the National Register of Historic Places or result in a recommendation for designation as a National Historic Landmark?

e) Will the proposed recovery result in the acquisition of new historical information or verify historical documentation?

f) Is the SCR threatened? Is it being damaged or destroyed by natural processes (such as erosion), or by human activity (intentional or unintentional)? Is the threat imminent and unavoidable?

g) Will the area be restored to its original condition?

h) Will recovery impede navigation?

5. The permit applicant, named principal investigator or supervisor of operations, must meet, at a minimum, the following qualifications to carry out the activity:

a. Hold a graduate degree in anthropology or archaeology, or equivalent training and experience;

b. Completed at least 12 months of experience in research concerning archaeological resources of the pertinent period, meaning that applicants proposing to study historic shipwrecks should have one year of experience in historic shipwreck research, etc.;

c. Demonstrate the ability to plan, equip, staff, organize, and supervise the type and scope of the proposed activity;

d. Demonstrate the ability to carry out research to completion, as evidenced by timely completion of theses, research reports, or similar documents; and

e. Completed at least 16 months of professional experience and/or specialized training in archaeological field, laboratory, or library research, administration, or management, including at least four months experience and/or specialized training in the kind of activity being proposed.

6. The permit applicant, named principal investigator, or supervisor of operations must directly supervise all permitted activities and participate in all recovery operations.

7. Permit applications to recover historical resources shall, at a minimum, include the following information:

- a. A research plan describing in detail specific research objectives;
- b. A statement of the project's research significance;
- c. A detailed operational plan including description of the proposed methods to be used for excavation, recovery, and storage of artifacts and related materials on site;
- d. An analysis of the extent and nature of potential environmental impacts to Sanctuary resources;
- e. A plan for site restoration and remediation;
- f. A statement of compliance with the Federal archaeological program Executive Order 11593 and federal statutes cited therein, and implementing regulations and guidelines);
- g. A signed agreement with an appropriate conservation facility detailing a plan for the conservation, curation and public display of artifacts consistent with Federal law (36 CFR Part 79);
- h. A signed agreement with a repository, i.e., museum, archaeological center, laboratory or storage facility managed by a university, college, museum, other educational or scientific institution, Federal, State or local government agency, to provide professional, systematic and accountable curatorial services on a long-term basis. Agreements shall, at a minimum, include:
  1. A statement that identifies who owns and has jurisdiction over the collection;
  2. A statement of work to be performed by the repository, including how the artifacts will be stored, assessed, preserved, maintained, exhibited, and conserved; and

3. A statement of the responsibility of the permittee.

i. A plan for the storage and public availability of records related to the research project and the artifacts;

j. A separate statement of the professional qualifications for each personnel member who will conduct the activities involved in the project, signed and certified by that personnel member; and

k. Any other information that may be determined necessary on a case-by-case basis.

8. The permittee shall submit a final report detailing the research plan, methodologies, field operations, and research findings.

9. A permittee authorized to excavate and recover an historical shipwreck may:

- a. Make presentations on the results of the recovery activity and the archaeological findings in public forums;
- b. Prepare scientific and nontechnical, popular publications; and
- c. Make artifacts and other materials recovered from the shipwreck available for future study, public interpretation, and public exhibition.

10. NOAA or the State of Florida may periodically monitor permitted recovery activities to ensure that they are in compliance with all terms and conditions of the permit.

11. NOAA or State of Florida officials who monitor permitted activities shall have the authority to immediately suspend the permit if it appears the activity is not in compliance with the conditions and terms of permit. Once work is suspended, work may not resume until NOAA and the State have conducted a thorough review and notified the permittee of their findings.

12. Any person applying for a permit must demonstrate their financial ability for the proposed activity. In cases where NOAA and the State are concerned about the financial ability to complete the project, a performance bond or other security to cover costs associated with the recovery, conservation and final report may be required in order to approve the



permit. The terms of the performance bonds shall be deemed fulfilled when the recovery activity is completed in compliance with the permit, the recovered items are properly conserved and analyzed, and the final report submitted pursuant to subparagraph (E)(8) is jointly reviewed and approved by NOAA and the State of Florida.

13. The permittee, at his or her expense, shall provide secure storage of artifacts. NOAA and State approval of the storage facility may include the waiver of the insurance requirements.

#### **F. Survey/Inventory Permits**

1. NOAA and the State of Florida agree that to adequately protect historical resources within the FKNMS it will be necessary to develop a detailed understanding of the number, nature, location, and historical significance of shipwrecks in the FKNMS.

2. To assess the number, nature, location, and historical significance of shipwrecks in the FKNMS, nonintrusive surveys of historical resources are encouraged. Survey/inventory activities that are non-intrusive, do not include any excavation, removal, or recovery of historical resources, and do not result in destruction of, loss of, or injury to Sanctuary resources or qualities, do not require a permit. However, if a survey/inventory activity will involve test excavations or removal of artifacts or materials for evaluative purposes, a Survey/Inventory of Historical Resources permit is required.

3. Applications to conduct surveys shall contain a description of the methodology to be employed. Preference shall be given to applications for survey/inventory permits that propose employing superior scientific methodologies and techniques, i.e., the use of magnetometers, side-scan sonar, sub-bottom profilers, and remotely operated vehicles, if appropriate for the area being surveyed. No more than one permit will be issued for a particular site for a particular period of time. The duration of permits should not exceed five years.

4. Authorized survey activities shall be conducted according to the following minimum requirements:

- a. Surveys should be conducted systematically, with sufficiently close lane spacing to provide accurate, detailed coverage of the survey area;
- b. Surveys should be conducted by a team that includes, at a minimum, persons trained or

experienced in the conduct of marine surveys, the use of remote sensing equipment, and the examination and analysis of remote sensing readings for the purpose of identifying shipwrecks.

- c. The location of a shipwreck should be recorded on a map using a standard coordinate system.

5. All SCRs located during a remote-sensing survey should be groundtruthed through seabed inspection, either by remotely operated vehicle or divers. Shipwrecks should be examined to determine the nature, extent and integrity of the wrecked vessel, surviving cargo, and associated scattered wreckage, and to locate any visible human remains.

6. SCRs shall be examined in a nondestructive and nondisturbing manner. Determinations of a shipwreck's type, age, condition, and, when possible, specific identity shall be made without test excavations or removal of artifacts or other materials.

7. When test excavations are necessary or artifacts or other materials must be removed, i.e., if the shipwreck is embedded or encrusted, the amount to be excavated or removed shall be as limited as possible to make evaluations, and be done using archaeological methods. Any artifacts or other materials recovered from historic shipwrecks shall be conserved by a nautical conservator.

8. All tapes, equipment readings, field notebooks, and logs generated during surveys shall be collated and archivally saved for future study.

9. Survey reports that describe the areas surveyed, survey methods used, and the results of the survey shall be prepared and published. Copies of the reports shall be submitted to NOAA and the State of Florida.

#### **G. Research/Recovery Permits**

1. NOAA and the State of Florida agree that research involving excavation, recovery or other intrusive activities will be prohibited, unless authorized and strictly regulated by a research/recovery or deaccession/transfer Special-use Permit issued pursuant to section H.

2. Based upon the need to protect natural and historical resources, and the potential use of the resource for research, education, recreation, or other

public or private uses, use of historic resources *in situ* is preferred.

3. Recovery of historical resources may be appropriate if NOAA and the State of Florida determine that such activity is in the public interest and that the removal of historical resources may be necessary or appropriate to protect the resource, preserve historical information and/or fulfill other NMSA purposes, such as land based research, education, public access and appreciation.

4. Recovery of historical resources will only be permitted as part of research to preserve the historic information for public use.

5. NOAA and the State of Florida will jointly determine whether intrusive research/recovery should be permitted on a case by case basis, weighing and balancing the values and uses a particular shipwreck may have, the potential public benefits to be derived from the proposed recovery, and the potential adverse effects to be caused by the proposed activity. Only those recovery activities for which a public interest is demonstrated and that further the purposes and policies of the NMSA and FKNMSPA shall be authorized.

6. To determine whether a proposed recovery activity is in the public interest, NOAA and the State of Florida shall, at a minimum, consider the public interest consideration set forth in E.4 and the following:

- a. The shipwreck's current and potential future values and uses and whether the proposed recovery is consistent with or enhances such values and uses;
- b. The archaeological or historical significance of the shipwreck site;
- c. The structural integrity of the shipwreck site and the potential adverse effects that may result from the proposed recovery; and
- d. The environmental impacts of the proposed recovery activity.

7. For any research/recovery activity proposed within the FKNMS, the artifacts and material remains that are recovered from the shipwreck site shall remain public resources, unless transfer of title has occurred pursuant to a permit described in section H.

## H. Deaccession/Transfer Special-use Permits

1. NOAA and the State of Florida agree that based upon the potential use of historical resources for research, maintaining recovered resources together at one location as a collection is preferred. However, agreements for the curation and display of recovered historical resources may provide for distribution of artifacts in order to fulfill resource protection, research, education or other purposes of the Sanctuary.

2. The following types of artifacts are historical resources and shall remain Sanctuary resources and shall not be unconditionally transferred to the private sector, unless the NOAA Marine Archaeologist and the State archaeologist (NOAA/State archaeologists) determine that the artifact is no longer of historical interest pursuant to paragraphs 11-13:

- a. All portions of shipwrecks, which are of archaeological interest and at least 50 years old, including, but not limited to, armaments, apparel, tackle, and cargo;
- b. Any material remains, if they are at least 50 years old and reflect past human life or activities, or have social, cultural, archaeological, aesthetic, or religious significance with regard to past human life or activities, found within or as part of a shipwreck, in the debris field of a shipwreck, or in an historical context. This includes, but is not limited to, any portion or piece of crafted items, modified raw materials, natural-state raw materials, food products, and paleontological remains.

3. NOAA and the State of Florida agree that there may be instances in which certain historical resources are no longer of historical interest and, therefore, may be transferred into private ownership.

4. NOAA and the State of Florida agree that if the NOAA/State archaeologists determine that an object is not an historical resource, pursuant to 2(a) or 2(b), it may be available to the party that recovered it pursuant to a valid Sanctuary permit.

5. NOAA and the State of Florida agree that if certain artifacts or portions of a collection of artifacts become available for transfer to the private sector, all of the artifacts shall have first been conserved, analyzed, interpreted in a published report, and in each instance, representative samples retained for research, education, or public display.

6. NOAA and the State of Florida agree that transfer of artifacts may occur only after field operations and laboratory analysis are completed and the final report is approved by the NOAA/State archaeologists.

7. NOAA and the State of Florida agree that to the extent possible, the items transferred shall be preserved and maintained as an intact collection and shall be made available for future study, public interpretation, and exhibition.

8. NOAA and the State of Florida agree that as a condition of transfer of ownership of artifacts, information on the recovery activity and the archaeological findings shall be disseminated by the permittee to the scientific community and the public.

9. NOAA and the State of Florida agree that after an artifact has been conserved, analyzed, and interpreted in a published report, the NOAA/State archaeologists may determine that the significant historical information has been preserved and that the artifact is no longer necessary for providing additional significant scientific or humanistic understanding of past human behavior, cultural adaptation, and related topics. In such an instance, the artifact may become available for transfer to the private sector.

10. NOAA and the State of Florida agree that the following items, if determined by the NOAA/State archaeologists to be randomly deposited and found outside of a shipwreck, shipwreck debris field, or historical association and determined by the NOAA/State archaeologists to have no future potential for indicating any hitherto unknown or indefinite historical resource, shall not be of historical interest and may be transferred to the private party that recovered it under the terms of a valid permit. Such items include:

- a. Unworked minerals and rocks;
- b. Modified raw materials (ingots, bullion, pigs);
- c. Coins, gems, projectiles.

To determine whether the artifact may be available for transfer to the private sector, the NOAA/State Archaeologists shall consider the factors listed in paragraphs 11-13.

11. The following criteria shall be applied to determine whether an artifact is of historical significance:

- a. Items with no archaeological association are usually of low historical interest;

- b. An intact collection is usually of higher historical value than unrelated artifacts;
- c. Identical artifacts are usually of low historical interest when a representative sample is retained in public ownership;
- d. Similar artifacts are usually of low historical interest when a sample representing all types is retained in public ownership;
- e. Items of unmodified raw material are usually of low historical interest when a sample representing the full range of variation is retained in public ownership;
- f. Items of modified raw material are usually of moderate historical interest;
- g. Items that are rare or unique are of high historical interest;
- h. Items that have future potential for archaeological, historical, cultural, or scientific research are of high historical interest.

12. The NOAA/State archaeologist shall determine the final disposition of artifacts as follows:

- a. Certain artifacts of high historical interest, or overriding cultural or scientific importance are not available for transfer of title;
- b. All artifacts are available for loan or other uses short of ownership as means of generating revenue provided the permit conditions have been satisfied and artifacts are properly cared for;
- c. Items that are recovered illegally, or in violation of a permit or condition thereof are not available for transfer of title;
- d. Certain artifacts of low historical interest may be available for transfer of title.

13. The decision to transfer title is to be made by the NOAA/State archaeologists pursuant to the following criteria:

- a. Items of low historical interest regardless of age may be transferred;
- b. Items greater than 50 years of age, and having moderate historical interest, may be

transferred, provided that no such artifacts shall be conveyed until all conditions of a deaccession/transfer permit have been satisfied and representative samples have been retained;

- c. Items of high historical interest shall not be transferred.

# Volunteer Action Plan

***This action plan identifies and describes the volunteer activities that will be implemented through a variety of strategies in the Florida Keys National Marine Sanctuary. The activities and strategies within the plan are derived from Alternative III, the most-balanced of the mid-range management alternatives. For each strategy, the component volunteer activities, existing level of program implementation, and organizations or individuals that will be responsible for implementing and conducting any new programs are outlined (Table 23). As volunteers are not paid staff, funding levels have not been included. Also, because the rate and level of volunteer activity implementation will be based largely on the implementation of other strategy components, scheduling information is not currently available. Finally, although the plan includes the most complete set of volunteer activities, only a subset will be implemented in the first year of Sanctuary operation. They are, however, still expected to be a significant component of the Sanctuary management process.***

## Introduction

Volunteer activities and programs are critical to the success of many boating, recreation, fishing, water quality, and education strategies in the Sanctuary Management Plan. Based on the lack of funding available to implement a variety of strategy components, and the success of the volunteer programs at both the Key Largo and Looe Key National Marine Sanctuaries, volunteers are seen as a valuable Sanctuary resource.

In addition to supporting management activities in the Sanctuary, the Volunteer Program will also help coordinate assistance in other Sanctuary-related tasks (e.g., administrative and office work), and will allow other agencies and groups in the state to work together in solving common management and administrative problems.

Developing an Integrated Program. The Volunteer Program will be the focal point for determining the timing, source, type, and degree of volunteer assistance provided for each strategy in this plan. It will be used to develop an organized method for providing volunteer assistance to the various public and private institutions involved in implementing strategies within the Sanctuary. Accordingly, volunteer efforts will be

planned, deliberate actions designed to accomplish specific management objectives.

A volunteer coordinator position was established in 1992 through a national cooperative agreement between NOAA and The Nature Conservancy (TNC), and is jointly funded by the two organizations. The coordinator will be responsible for implementing the Volunteer Program, and will work directly with the Sanctuary Superintendent to coordinate all volunteer activities. The coordinator will also be responsible for ensuring that the volunteer components of each strategy are fulfilled. This will require interaction with the individuals (e.g., Sanctuary staff, interagency personnel, and others) responsible for implementing the other components of the strategies in this plan.

**How the Plan is Organized.** This action plan is organized in three sections: an introduction, description of strategies, and a discussion of implementation considerations. The introduction provides background information on the Volunteer Program and provides a brief summary of volunteer programs already in place at the Sanctuary. It also summarizes the goals and objectives of existing and proposed volunteer activities.

The strategy description section groups volunteer activities based on whether they are components of boating, fishing, recreation, research and monitoring, or education strategies. A volunteer program for administrative support is also described, and related activities currently in place are summarized. In addition, the agencies or organizations responsible for implementing the volunteer activities are identified for each strategy.

The final section discusses some considerations for implementing the plan. It emphasizes the supporting role of volunteers in strategy implementation, and how these efforts will be organized.

While the implementation schemes of many strategies in the Management Plan require volunteer assistance to be fully successful, the implementation scheme for specific strategies is only described in detail in the appropriate action plan.

## Background

Requirements of the Volunteer Program. The type of volunteer participation implemented will depend on the strategy to be completed. Although Keys-wide

community participation will be encouraged, selected activities will require specific technical skills. Volunteers that are certified divers, for example, may be asked to be "buddy divers," or boat owners may be asked to help implement certain on-water activities. Volunteers with boat maintenance and repair or carpentry skills will also be needed to complete the activities within some strategies.

**Facilities.** The Volunteer Coordinator's office is currently located at the Sanctuary Administrative Office in Marathon. It is considered centrally located, and it is expected that the office remain there. Additional temporary work space for volunteers is needed, and sites in Key West, Marathon, and Key

Largo will be considered when new space allocations are made. Each location should have two desks and a computer.

**Personnel.** The Volunteer Program has grown rapidly since its inception in 1992. Because of the territory covered, as well as the diversity of projects included, additional support staff will be required to assist the Volunteer Coordinator.

The strategies for the Management Plan, which includes the Volunteer Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on

Table 23. Summary of Strategies and General Sanctuary Support Items Requiring Volunteer Assistance

Page	Strategies	Overall Sanctuary Priority Level <sup>+</sup>	Planned Level of Action in Year 1	Associated Action Plans
<b>197 Boating</b>				
197 B 1	Boat Access <sup>1</sup>	*	--	Channel Marking, Mooring Buoy
197 B.2	Habitat Restoration	Low	None	Research & Monitoring
197 B 3	Derelict Vessels	Low	None	
198 B 4	Channel/Reef Marking	High	Low	Channel/Reef Marking, Regulatory
198 B 9	Visitor Registration	Low	None	
198 B 10	Damage Assessment	Medium	Medium	
<b>199 Fishing</b>				
199 F 7	Artificial Reefs	Low	None	Regulatory, Research & Monitoring
199 F 9	Gear Removal	Low	None	
199 F 11	Gear/Method Impacts	Low	None	Research & Monitoring
<b>200 Recreation</b>				
200 R 1	SCR Management	Medium	Low	Regulatory, Submerged Cultural Resources
200 R 2	Recreation Survey	Low	None	
<b>201 Education and Outreach</b>				
201 E 1	Printed Materials	High	Low	Education and Outreach
201 E.2	Audio-Visual Materials	Medium	Low	Education and Outreach
202 E 3	Signs/Displays/Exhibits	Medium	Low	Education and Outreach
202 E 4	Training/Workshops/School Programs	Medium	Low	Education and Outreach, Water Quality
202 E.5	PSAs	Medium	Low	Education and Outreach
203 E 7	Promotional	Medium	Low	Education and Outreach
203 E 10	Public Forum	Medium	Low	Education and Outreach
203 E 11	Special Events	Medium	Low	Education and Outreach
<b>204 Research and Monitoring</b>				
204 W 20	Monitoring	High	Low	Research & Monitoring, Water Quality
204 W 33	Ecological Monitoring	High	Low	Research & Monitoring, Water Quality
<b>205 General FKNMS Support</b>				
205	Office Support		Not Applicable	
205	Computer Support		Not Applicable	
205	Marine and Dock Maintenance		Not Applicable	
205	Fundraising		Not Applicable	
205	Inter-organizational Volunteer Coordination		Not Applicable	
205	Group Leaders		Not Applicable	
205	Boat Captains		Not Applicable	
206	Special Projects		Not Applicable	

<sup>+</sup> Strategies with an \* for Overall Sanctuary Priority Level are already existing programs and/or will be completed in the first year of sanctuary operation.

<sup>1</sup> Much of this strategy will be completed prior to year 1, however, it includes an activity that will continue indefinitely.

### Existing Programs

The National Marine Sanctuary Program has a history of using volunteers to assist with activities ranging from maintenance tasks to public education programs at both the Key Largo and Looe Key national marine sanctuaries. Volunteers currently help with office support, vessel and vehicle maintenance, underwater cleanup efforts, data entry and database development, festival and special booth interpretive activities, mooring buoy installation and maintenance, and special request response projects. In addition, they act as visiting group leaders, boat captains, and aerial and on-water interpreters. Based on the success of these existing programs, it is expected that volunteer assistance in these and other program areas will be an integral part of the Florida Keys National Marine Sanctuary Program.

**Sanctuary Management Assistance.** The Sanctuary's volunteer coordinator is currently working with Sanctuary management to establish a framework for implementing education and outreach, research and monitoring, and other management strategies with a volunteer component. Volunteers are also visiting businesses and other sites in the Keys to determine their interest in displaying Sanctuary materials, are interviewing businesses about

their knowledge of the Sanctuary program, and are developing a list of questions commonly asked about the Sanctuary. Existing volunteer programs that contribute to Sanctuary management but are not specific Sanctuary programs include boat and marina surveys; the monitoring of corals, rocky intertidal areas, sponges, algae, mangroves, and Florida Bay salinity; and the delivery of dive cards to dive shops. The Nature Conservancy has developed a Florida Bay Watch program that will use volunteers to collect water samples.

**Program Under Development.** In addition to these activities, a major volunteer program is currently under development. It is a cooperative effort between the Sanctuary Program and the Professional Association of Dive Instructors (PADI), using the association's expertise to develop a more-comprehensive diver training program that will lead to improvements in environmental monitoring techniques. Modules of the PADI program currently being considered would focus on fish identification, artificial reef monitoring, reef cleanups, and marine archaeology. After the development and application of a pilot project, the program will be used as the prototype for similar programs in other national marine sanctuaries.

factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Volunteer Strategies.** Volunteers will help implement 21 management strategies. Strategy B 1, Boat Access, is an existing program and will be completed in year 1. The two highest-ranking strategies (both high priority level) requiring volunteer assistance are Channel Marking (B 4) and Monitoring (W 20). Other high priority level strategies requiring volunteer assistance include Printed Materials (E 1) and Ecological Monitoring (W 33). In addition, nine medium priority level strategies will require volunteer assistance, and each will have some level of activity in year 1. The seven remaining strategies with a volunteer component are a low priority level, and are not expected to be implemented in year 1.

**Types of Volunteer Assistance.** This plan describes the level and type of assistance that each strategy with a volunteer component is expected to have.

However, volunteer needs may change based on strategy modifications. In addition, the type of effort currently expected may not be required during implementation, and a different type of effort may be required once a strategy is in place. Also, volunteers may be useful in implementing strategies not currently included in this plan, and they will help complete a number of additional tasks, including office and computer support and Sanctuary maintenance activities. They will also assist other agencies and organizations with programs that complement the Sanctuary Program's goals.

**Relationship to Other Action Plans.** Because of the nature of the education strategies, volunteers will provide a useful, economical, and efficient means of strategy implementation. Volunteers will also assist in activities that are components of the Channel/Reef Marking, Enforcement, Mooring Buoy, Research and Monitoring, and Water Quality action plans. As noted previously, the details of the overall implementation schemes for the strategies in these action plans can be found in the specific plan. This action plan only describes the volunteer assistance expected to be required for each strategy.

## **Goals and Objectives**

**Sanctuary Goals.** One goal of the Volunteer Program is to support efforts to improve public education and awareness about the Sanctuary. Another is to provide information to Sanctuary managers to allow them to make more informed decisions and update the overall Management Plan. Volunteers also provide a mechanism for involving the community in Sanctuary activities, and represent a valuable resource to accomplish a variety of additional Sanctuary tasks. Because of limited funding, volunteer assistance will be critical to the ultimate success of many Sanctuary strategies. Volunteers will assist in a variety of Sanctuary activities including research and monitoring, education and outreach programs, underwater projects, Sanctuary representation at certain events and functions, and office/administrative tasks.

Another goal of the Sanctuary Volunteer Program is to develop a strategy to target recruitment of volunteers. The strategy will propose approaches to generating interest in the Program; explore sources to recruit from ( i.e. community groups, churches, neighborhood associations, other volunteer groups, government agencies); encourage schools to start nature clubs from which volunteers may be recruited; and explore ways to appeal to potential volunteers with a diversity of interests and skills. The strategy will define training areas, qualifications (such as boating and diving skills or research knowledge), and who will provide the new volunteer's training. The new strategy will provide recognition for the volunteers that will help keep them involved and interested and put a high priority in providing them a sense of stewardship.

**Sanctuary Objectives.** The overall objective of the Volunteer Program is to develop a system of public involvement in supporting the Sanctuary Program in a "hands-on" manner. Volunteers will support many Sanctuary activities that would otherwise not be accomplished as efficiently.



## Description of Strategies

### Boating

Six boating strategies have a volunteer component. Volunteers will help with boater surveys, underwater habitat restoration projects, the removal and disposal of abandoned and derelict vessels, channel/reef marking, and other activities.

#### **Boating Strategies**

##### **B.1: Boat Access**

- Assist in a public-access survey

##### **B.2: Habitat Restoration**

- Serve as "buddy divers" and underwater assistants

##### **B.3: Derelict Vessels**

- Assist in a survey of abandoned and derelict vessels

##### **B.4: Channel/Reef Marking**

- Help map channel/waterway marking areas

##### **B.9: Visitor Registration**

- Serve as registrars for the Sanctuary

##### **B.10: Damage Assessment**

- Assist the damage assessment team

### Strategy B.1: Boat Access

Conduct a survey to assess public and private boat access throughout the Sanctuary.

#### **• Assist in Updating Public-Access Survey.**

Volunteers will assist in updating information to be included in the marine facilities database.

■ **Implementation.** The Volunteer Coordinator will be responsible for organizing volunteer assistance. The Florida Department of Environmental Protection (FDEP) will be the lead agency responsible for implementing this activity. NOAA and Monroe County will provide support.

*The implementation scheme for this strategy is described in the Channel/Reef Marking Action Plan. The strategy is also included in the Mooring Buoy Action Plan.*

### Strategy B.2: Habitat Restoration

Conduct a program of restoration research at representative habitat sites within the Sanctuary; develop a restoration plan and implement restoration at severely impacted areas. Monitor recovery processes.

#### **• Serve as "Buddy Divers" and Underwater Assistants.**

The Keys population contains many individuals with a scientific background. Volunteers will assist researchers with habitat restoration by becoming "buddy divers" and underwater assistants.

■ **Existing Program Implementation.** For several years, volunteers have helped with scientific research projects at the Key Largo and Looe Key national marine sanctuaries by acting as "buddy divers" on an ad-hoc basis.

■ **Implementation.** The Volunteer Coordinator will be responsible for implementing this activity. Overall, NOAA and the FDEP will be the lead agencies responsible for strategy implementation. Various nongovernmental organizations (NGOs) will assist in implementation.

*The implementation scheme for this strategy is described in the Research and Monitoring Action Plan.*

### Strategy B.3: Derelict Vessels

Develop a removal and disposal plan for derelict and abandoned vessels throughout the Sanctuary, streamline the existing permitting process, and require the removal of derelict and abandoned vessels throughout the Sanctuary.

#### **Assist in a Survey of Abandoned and Derelict Vessels.**

Volunteers will assist in surveying for derelict vessels and recording information about the location, type, size, and weight of such vessels.

■ **Existing Program Implementation.** Volunteers, especially boat captains, have contacted representa-

tives of the Key Largo and Looe Key national marine sanctuaries when derelict vessels have been identified.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, the FDEP will be primarily responsible for strategy implementation. Monroe County, NOAA, and NGOs will aid in implementation efforts.

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### Strategy B.4: Channel/Reef Marking

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Establish a channel/waterway marking system throughout the Sanctuary.

• **Help Map Marking Areas.** Volunteers will assist in assessing boater-use and impact levels. They will also help develop a standardized marking system, determine the criteria used to evaluate which channels will be marked, and install channel/reef markers.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA and Monroe County will share the lead responsibility for strategy implementation. The U.S. Coast Guard (USCG) and the FDEP will provide secondary implementation support.

*The implementation scheme for this strategy is described in the Channel/Reef Marking Action Plan. This strategy is also included in the Regulatory Action Plan.*

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### Strategy B.9: Visitor Registration

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Establish a voluntary visitor registration program to assess user activity in the Sanctuary.

• **Serve as Registrars for the Sanctuary.** Volunteers will work with Sanctuary staff at marinas, local chambers of commerce, visitor centers, Sanctuary offices, and other Federal, State, and local agencies to conduct surveys of areas visited most frequently, and types of visitor activities. The goal is to evaluate Sanctuary-use patterns.

■ **Existing Program Implementation.** Sanctuary officers have informally gathered information on visitor-use patterns for the past 17 years.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

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### Strategy B.10 Damage Assessment

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Establish damage assessment standards for vessel groundings in the Sanctuary.

• **Provide Assistance to Damage Assessment Team.** Volunteers will assist the damage assessment team by helping with equipment, measurements, and other activities related to underwater damage assessment activities.

■ **Existing Program Implementation.** NOAA and the FDEP are currently planning to establish damage assessment procedures.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

### Fishing

Three fishing strategies have a volunteer component. Volunteers will assist in research activities and on-water programs.

#### Fishing Strategies

##### F.7: Artificial Reefs

- Assist in data collection

##### F.9: Gear Removal

- Assist in gear removal

##### F.11: Gear/Method Impacts

- Assist with research on low-impact fishing gear

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### Strategy F.7: Artificial Reefs

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Conduct research on the impacts of artificial reefs on fish and invertebrate populations for long-term management, including location, size, materials, etc. Monitor and evaluate habitat modification caused by the installation of marine structures. Assess and develop regulations for artificial reef construction, and evaluate habitat suitability for artificial reefs.

• **Assist in Data Collection.** Volunteers will assist researchers in gathering information on the impacts of artificial reef development on fish and invertebrate populations. They will also help compile information about habitat modifications resulting from artificial reef construction.

■ **Existing Program Implementation.** An ongoing Sanctuary/Professional Association of Dive Instructors (PADI) project involves training volunteer divers in underwater data-collection techniques. Training divers in artificial reef data-collection techniques is one element of the project. NOAA, the PADI, Florida Sea Grant, and other NGOs are involved in developing this project.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, the FDEP will be the lead agency responsible for implementing this strategy. The National Marine Fisheries Service (NMFS), Monroe County, and Florida Sea Grant will provide secondary implementation support.

**The implementation scheme for this strategy is described in the Research and Monitoring Action Plan.**

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### Strategy F.9: Gear Removal

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Develop a program for the removal of lost or out-of-season fishing gear, and implement in all areas of the Sanctuary.

• **Assist in Gear Removal.** As soon as the areas considered high-priority for cleanup have been identified and removal methods determined, volunteers will assist in removing abandoned fishing gear and traps. This activity will complement the general underwater cleanups that occur several times a year.

■ **Existing Program Implementation.** The ongoing Sanctuary/PADI project includes a gear-removal component.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for strategy implementation. The process for developing and implementing regulations is described in the Regulatory Action Plan.

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### Strategy F.11: Gear/Method Impacts

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Conduct research on alternative fishing gear and methods that minimize impacts on habitat. Implement a voluntary program to encourage the use of low-impact gear and methods. Implement regulations to require the use of low-impact gear and methods in priority areas. Characterize harvesting stresses affecting outer and inshore reefs and hardbottom ecosystems.

• **Assist with Research on Low-Impact Fishing Gear.** Volunteers will assist Sanctuary staff by researching the use of low-impact fishing gear and methods.

■ **Implementation.** The Volunteer Coordinator will administer this activity. The South Atlantic and the Gulf of Mexico fisheries management councils and the Florida Marine Fisheries Commission (FMFC) will share the lead responsibility for strategy implementation. The FDEP and NMFS will provide secondary implementation support.

**The implementation scheme for this strategy is described in the Research and Monitoring Action Plan.**

## Recreation

Two recreation strategies have a volunteer component. They will primarily involve data-collection efforts.

### Recreation Strategies

#### R.1: SCR Management

- Assist in inventorying submerged cultural resources
- Volunteer training program

#### R.2: Recreation Survey

- Assist in implementing the recreation survey

### Strategy R.1: SCR Management

Develop and implement a program to manage submerged cultural resources. Conduct an inventory of submerged cultural resources and assess survey and extraction techniques within the Sanctuary. Require permitting throughout the Sanctuary.

• **Assist in Inventorying of Submerged Cultural Resources.** Volunteers will assist Sanctuary staff in compiling an inventory of submerged cultural resources, and will assist researchers in compiling specific site data (including name, age, integrity, and historical significance). Volunteers will also help develop a shipwreck survey and a comprehensive bibliography.

■ **Existing Program Implementation.** The ongoing Sanctuary/PADI project includes a module for inventorying and mapping SCRs.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for strategy implementation.

• **Volunteer Training Program.** A volunteer training program will be established to provide a mechanism for general public involvement in SCR research, documentation, and management.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, the National Park Service (NPS) and Florida Division of Historical Resources (FDHR) will share responsibility for strategy implementation.

**The implementation scheme for this strategy is described in the Submerged Cultural Resources Action Plan. This strategy is also included in the Regulatory Action Plan.**

### Strategy R.2: Recreation Survey

Establish a routine survey of recreational activities and use levels within the Sanctuary through a survey of charter and recreational-for-hire vessels, intercept surveys at access points and launch sites, and periodic field surveys.

• **Assist in Implementing the Recreation Survey.**

Volunteers will help conduct a survey to determine types, levels, users, and locations of recreation activities within the Sanctuary. They also will assist in interviewing captains of charter and recreational-for-hire vessels and the general public at access points, launch sites, and on the water. The survey will collect information on operator and safety equipment and visitor behaviors, such as the use of gloves and buoyancy vests.

■ **Existing Program Implementation.** Volunteers have interviewed commercial boat captains as part of the recreation survey.

■ **Implementation.** The Volunteer Coordinator will implement and administer this activity. Overall, NOAA will be the lead agency responsible for strategy implementation.

## Education and Outreach

Every education and outreach strategy (except E.6) has a volunteer component, and volunteer assistance is critical to the success of the Sanctuary's Education and Outreach Program.

### Strategy E.1: Printed Materials

Develop printed materials to promote public awareness of the impact of their activities, both land and water-related, on the Sanctuary's resources and environmental quality. Promote the proper use of equipment used for these activities in order to minimize adverse impacts to natural resources. Materials will include brochures, posters, newsletters, contributions to periodicals, environmental nautical charts, color environmental atlases, and a color periodical. Distribute materials in bulk to high-interception locations (e.g., marinas, boat ramps, dive shops, other businesses, etc.), and include bulk mailings as a means of distribution.

• **Assist Sanctuary Staff in Developing and Distributing Printed Materials.** Volunteers will assist the Education and Outreach Program staff by gathering references and developing artwork for printed materials. They will also help distribute the materials to high-interception locations. In addition, volunteers may provide the translations for multilingual materials.

■ **Existing Program Implementation.** Volunteers have assisted with the production of printed materials and the distribution of brochures.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

*The implementation scheme for this strategy is described in the Education and Outreach Action Plan.*

### Strategy E.2: Audio-Visual Materials

Inventory and use existing videos, films, and audio-visual environmental education materials portraying

activities in the Florida Keys and their impacts on Sanctuary resources. Produce a limited number of audios/videos to address gaps in available materials, and to address major activities including boating, fishing, diving, etc. Materials will be available at Sanctuary offices and will be distributed to key locations (dive shops, etc.) throughout South Florida.

■ **Assist in Developing the Audio-Visual Library and Audio-Visual Products.** Volunteers will help assemble available audio-visual environmental education materials, and will also assist in producing a limited number of audios/videos to address gaps in available materials. The goal is to create a library for use by the public, private organizations, and Sanctuary staff.

■ **Existing Program Implementation.** Volunteers are currently assisting the staff at the Key Largo National Marine Sanctuary by cataloging videos and assembling a slide library.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the

### Education and Outreach Strategies

#### E.1: Printed Materials

- Assist Sanctuary staff in developing and distributing printed materials

#### E.2: Audio-Visual Materials

- Assist in developing the audio/video library and audio and video products

#### E.3: Signs/Displays/Exhibits

- Assist in developing and installing Sanctuary signs/displays/exhibits

#### E.4: Training/Workshops/School Programs

- Assist in training, workshops, and school programs

#### E.5: PSAs

- Assist in developing public service announcements

#### E.7: Promotional

- Assist in developing promotional materials

#### E.10: Public Forum

- Assist in preparing for public meetings
- Volunteers speakers bureau
- Assist with Sanctuary watch hot line

#### E.11: Special Events

- Assist at trade shows and special events

lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

***The implementation scheme for this strategy is described in the Education and Outreach Action Plan.***

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### **Strategy E.3: Signs/Displays/Exhibits**

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Develop signs/displays at high-use areas, all public and some private boat ramps, and some public beach access areas, to inform participants in water-based activities of regulations and environmentally sound practices, provide navigation information, and promote awareness of nearby sensitive areas. Portable displays will also be produced with information on Sanctuary resources, regulations, environmental quality, etc. Most of the signs will be multilingual. Targeted multimedia displays will be developed with information and impacts on the Sanctuary relevant to the activity targeted. A number of wayside exhibits will be installed.

Develop a user-friendly computer system containing information on regulations, access, recreational sites, environmental etiquette, etc. for visitor use at selected sites throughout the Sanctuary within five years.

• ***Assist in Developing and Installing Sanctuary Signs/Displays/Exhibits.*** Volunteers will assist the Education and Outreach Program staff in producing and installing multilingual signs and static displays and will advise staff on the placement of the signs and displays. They will also help set up and take down traveling exhibits, and will compile information for the development of a user-friendly computer system.

■ ***Implementation.*** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

***The implementation scheme for this strategy is described in the Education and Outreach Action Plan.***

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### **Strategy E.4 Training/Workshops/School Programs**

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Develop opportunities for instruction and training. This will include programs conducted by teachers, Sanctuary staff, and volunteers. Training programs (e.g., Coral Reef Classroom, submerged cultural resources, etc.) will also be provided for teachers, environmental professionals, business owners and operators, and law enforcement officials.

• ***Assist in Training, Workshops, and School Programs.*** This activity will result in a formal training program for new volunteers, involving basic education/orientation about the marine Sanctuary program, as well as task-oriented training that will enable volunteers to assist with in-school presentations and on-site programs.

■ ***Existing Program Implementation.*** The Sanctuary's Volunteer Program Coordinator currently assists with the Sanctuary Program orientation.

■ ***Implementation.*** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

• ***Deliver Education Message at the Resource.*** Volunteers located at popular sites where the public is likely to access the resource will help to deliver resource education and interpretation at the site of the resource (i.e., Team O.C.E.A.N.).

■ ***Existing Program Implementation.*** Currently education staff provide program orientation and support for this activity. Sanctuary vessels are made available for this activity.

■ ***Implementation.*** Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

***The implementation scheme for these strategies are described in the Education and Outreach Action Plan. A component of this strategy is also included in the Water Quality Action Plan.***

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### Strategy E.5: PSAs

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Establish a program to promote Sanctuary goals and activities through public service announcements (PSAs) in South Florida, with some national and international public exposure, that presents an overview of the Sanctuary, its resources, and their ecological significance for routine distribution to radio, cable television stations, and newspapers. Develop editorial/contributions for other printed media. Funds will be spent on routine media exposure. PSAs would focus on participants in water-related and other activities that affect the Sanctuary (boaters, divers, household etc.). These materials will also be organized into a press packet.

- **Assist in Developing PSAs.** Volunteers will help produce multilingual public service announcements for radio and television, and will translate materials for printed media. Spanish-speaking volunteers, for example, will assist in producing PSAs broadcast in Spanish on Miami television and radio stations. Volunteers will also help compile and distribute a press packet.

- **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP and NGOs will provide secondary implementation support.

***The implementation scheme for this strategy is described in the Education and Outreach Action Plan.***

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### Strategy E.7: Promotional

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Promote educational materials, including bilingual materials and other information about the Sanctuary and its resources, at existing Sanctuary offices and local chambers of commerce. Establish interagency visitor centers with the U.S. Department of Interior (USDOI) and the Florida DEP.

- **Assist in Developing Promotional Materials.** Volunteers will help establish visitor booths/displays in Sanctuary offices, chambers of commerce, and at an interagency visitor center. They will also help identify other no-cost/low-cost spaces to display educational materials.

- **Existing Program Implementation.** Volunteers currently assist the education staff at the Key Largo National Marine Sanctuary office by displaying brochures for walk-in visitors.

- **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

***The implementation scheme for this strategy is described in the Education and Outreach Action Plan.***

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### Strategy E.10 Public Forum

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Establish a program to ensure public involvement throughout South Florida in Sanctuary activities by holding public meetings and promoting Sanctuary awareness to extracurricular groups.

- **Assist in Preparing for Public Meetings.** Volunteers will help Sanctuary staff organize public meetings, and will help develop a limited number of printed materials to support presentations to external organizations (4-H clubs, scouts, etc.) and NGOs.

- **Existing Program Implementation.** Volunteers currently help Sanctuary staff compile information packets for Advisory Council meetings.

- **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

- **Form a Volunteer Speakers Bureau.** Selected volunteers will be recruited and trained to deliver public programs to groups in South Florida. They will provide information about the Sanctuary to a wider range of groups than the staff can currently reach.

- **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

***The implementation scheme for this strategy is described in the Education and Outreach Action Plan.***

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### Strategy E.11: Special Events

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Organize, support, and/or participate in special events (e.g., trade shows, expositions, grand openings, etc.) that allow for the exchange of Sanctuary information. The Sanctuary will cosponsor a number of conferences and workshops, with selected sole sponsorship of some events. This would include a "Sanctuary Awareness Week" and a "grand opening" to the Sanctuary. The Sanctuary Program would cosponsor other "awareness" events/weeks (e.g., National Fishing Week, etc.).

• **Assist at Trade Shows and Special Events.**

Volunteers will assist Sanctuary staff at trade shows, local festivals, and special events.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

*The implementation of this strategy is described in the Education and Outreach Action Plan.*

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### Research and Monitoring

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Two research and monitoring strategies have a volunteer component. Volunteers will assist Sanctuary staff with many of the research activities in each strategy.

#### **Research and Monitoring Strategies**

##### **W.20: Monitoring**

- Provide monitoring assistance

##### **W.33: Ecological Monitoring**

- Assist in the monitoring program

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### Strategy W.20: Monitoring

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Conduct a long-term, comprehensive monitoring program as described in the EPA Water Quality Protection Program.

• **Provide Monitoring Assistance.** Volunteers will assist with the monitoring program to obtain information on the status and trends of the Sanctuary's water quality parameters and biological resources. This will include collecting samples for evaluating water column and sediment parameters. Volunteers will also help sample seagrass, hardbottom, and mangrove communities.

■ **Existing Program Implementation.** The Nature Conservancy has developed a Florida Bay Watch program to incorporate volunteer efforts into a water-sampling program.

■ **Implementation.** The Volunteer Coordinator will administer this activity. Overall, EPA and the FDEP will be the lead agencies responsible for implementing this strategy.

*The implementation scheme for this strategy is described in the Water Quality Action Plan.*

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### Strategy W.33: Ecological Monitoring

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Develop and implement a Sanctuary-wide, extensive ecosystem monitoring program. The objective of the program will be to monitor the status of various biological and ecological indicators of system components throughout the Sanctuary and adjacent areas, in order to discern the local and system-wide effects of human and natural disturbances, and assess the overall health of the Sanctuary.

• **Assist in the Monitoring Program.** Volunteers will help collect data on the status and trends of various ecological indicators. Volunteers will collect "presence and absence" data to provide fisheries researchers with additional information.

■ **Existing Program Implementation.** The Atlantis Dive Center in Key Largo is currently conducting a volunteer training program that teaches fish identification and data-collection techniques, as well as how to achieve high data confidence. In addition, The Nature Conservancy has developed and implemented a volunteer diver training program to compile information on the location and health of certain coral species, and the Sanctuary/PADI cooperative project has a module which includes benthic monitoring. Additionally, Reef Relief is currently conducting a photo-monitoring program on corals in the Lower Keys.



■**Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for implementing this strategy. The FDEP will provide secondary implementation support.

**The implementation scheme for this strategy is described in the Research and Monitoring Action Plan.**

### General FKNMS Support

Volunteer assistance is an integral part of many Sanctuary activities not associated with specific strategies. Volunteers will assist with general office and computer support tasks, maintenance activities, fundraising, and other important program elements as detailed below.

#### General Support Items

- Office support
- Computer support
- Marine and dock maintenance
- Fundraising
- Inter-organizational volunteer coordination
- Group leaders
- Boat captains
- Special projects

**Office Support.** Volunteers will provide general administrative support at the Sanctuary offices, including answering telephones, copying materials, preparing mailings, greeting visitors, and other duties as assigned.

■**Existing Program Implementation.** Volunteers are currently assisting staff at the offices with general administrative activities.

■**Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for administrative activities.

**Computer Support.** Volunteers will assist with data entry at several Sanctuary offices. Databases are updated on a daily or weekly basis, and volunteers will help develop databases or modify programs as requested by Sanctuary staff.

■**Existing Program Implementation.** Volunteers currently help the staff update their education database.

■**Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for office databases.

**Marine and Dock Maintenance.** Volunteers will help with marine maintenance and dock maintenance activities, including mooring buoy installation, repairs, and cleaning; vehicle maintenance; boat maintenance; grounds maintenance; and storage shed and dock area cleaning.

■**Existing Program Implementation.** Volunteers currently help marine mechanics with vehicle, vessel, and dock maintenance.

■**Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for marine maintenance activities and dock maintenance at Sanctuary offices.

**Fundraising.** Volunteers will help with fundraising activities, including researching what grants are available and providing assistance in developing grant proposals.

■**Existing Program Implementation.** Volunteers currently assist Sanctuary staff in reading the Federal Register on a weekly basis to identify available funding sources.

■**Implementation.** The Volunteer Coordinator will administer this activity. Overall, NOAA will be the lead agency responsible for fundraising activities.

**Inter-organizational Volunteer Coordination.** Volunteers will coordinate with staff from other government agencies and NGOs involved in Sanctuary activities. The goal is to provide volunteer assistance for projects administered by other agencies and organizations that support the Sanctuary.

■**Implementation.** The Volunteer Coordinator will administer this activity.

**Group Leaders.** Volunteers will be recruited and trained to lead specific projects conducted by groups visiting the Keys.

■**Existing Program Implementation.** Volunteers trained by Sanctuary staff currently lead some Sanctuary projects. Volunteers also lead group reef cleanups, and train and lead others in underwater environmental monitoring efforts.

■**Implementation.** The Volunteer Coordinator will administer this activity.

**Boat Captains.** Volunteers will be trained to operate Sanctuary vessels.

■**Existing Program Implementation.** Volunteers piloting Sanctuary vessels for visiting researchers and other volunteer programs.

■**Implementation.** The Volunteer Coordinator will administer this activity.

**Special Projects.** Volunteers will be contacted on an as-needed basis for special projects and one-time Sanctuary events.

■**Existing Program Implementation.** Each summer, dive shops and volunteers are contacted to help monitor when coral spawns.

■**Implementation.** The Volunteer Coordinator will administer this activity.

## Implementation

The purpose of the plan is to explain that volunteer efforts will be planned, deliberate actions designed to accomplish specific management objectives. All volunteer efforts will be organized and directed by a Sanctuary volunteer coordinator. However, the Volunteer Program is not a stand-alone component of the Sanctuary Program, and its success depends on its full integration into all Sanctuary programs and activities. All strategies in this plan will be implemented by a mix of agencies and organizations, some local and some national, as detailed in the action plans containing the specific strategies. The Coordinator will ensure that the volunteer portions of the strategies are implemented. This will require that the Coordinator work with Sanctuary staff, other agencies, and NGOs to implement volunteer activities. In cooperation with these agencies and groups, the timing, scope, and scale of volunteer effort for each strategy will be determined.

An implementation schedule is not included for each of the activities. Volunteer assistance will be used as much as possible within the boundaries of strategy implementation schedules described in the respective action plans. In addition, because these actions are voluntary, requiring little or no resources, funding data are not included (aside from the general information listed below). Cost estimates and personnel estimates are also excluded from this plan, since they are not appropriate and/or are already accounted for in the implementing action plans. Fund-

ing data and cost and personnel estimates are specified in the action plans listed at the end of each strategy description.

Not all of the volunteer activities listed in this plan will be implemented in year 1. Elements of certain strategies will begin in year 1 (e.g., volunteers inventorying visitor centers and businesses desiring Sanctuary displays), and Sanctuary managers will play a major role in determining priorities when several strategies need to be implemented simultaneously.

The Sanctuary's Volunteer Program will be funded jointly by NOAA and The Nature Conservancy. In 1992 the program budget was \$48,300 and included the salary of the Volunteer Coordinator, travel, supplies, equipment (including a computer), and uniforms. In 1993, the program budget was \$56,200. As the Program grows, the funding needs will increase. The Program demands are already increasing, and additional staff are needed to support the growing number of volunteers. NOAA and The Nature Conservancy must continue to support the Volunteer Program at a level that enables the necessary volunteer resources to be provided to the Sanctuary Program.

# Water Quality Action Plan

***The purpose of this action plan is to describe the suite of activities—including corrective actions, monitoring, and research—that are proposed to deal with water quality problems in the Florida Keys National Marine Sanctuary. Each activity is derived from the set of management strategies included in Alternative III. Although this is the final set of water quality activities for the Sanctuary, only a subset may be implemented due to a limited budget. The Water Quality Protection Program Document should be consulted for detailed information about water quality activities in the Keys. Table 24 summarizes key information about the implementation of water quality strategies.***

## Introduction

Recognizing the critical role of water quality in maintaining Sanctuary resources, Congress directed the U.S. Environmental Protection Agency (EPA) and the State of Florida to develop a Water Quality Protection Program for the Sanctuary. The purpose of the Program is to "recommend priority corrective actions and compliance schedules addressing point and nonpoint sources of pollution to restore and maintain the chemical, physical, and biological integrity of the Sanctuary, including restoration and maintenance of a balanced, indigenous population of corals, shellfish, fish and wildlife, and recreational activities in and on the water" (Florida Keys National Marine Sanctuary and Protection Act). In addition to corrective actions, the Act also requires the development of a water quality monitoring program and provision of opportunities for public participation in all aspects of developing and implementing the Program. This action plan is an abbreviated version of information contained within the Water Quality Protection Program Document.

***How the Plan is Organized.*** This action plan outlines the Sanctuary's proposed water quality activities according to the set of strategies included within the Preferred Alternative. The strategies provide a mechanism for achieving the goals of the Program. The plan is organized into three sections: 1) Introduction, 2) Description of Strategies, and 3) Implementation.

The introduction summarizes the goals and objectives of the Water Quality Action Plan and provides background on the development of the Plan.

The description of strategies section summarizes strategies grouped according to nine themes:

- Florida Bay/external influences;
- domestic wastewater;
- stormwater;
- marinas and live-aboards;
- landfills;
- hazardous materials;
- mosquito spraying;
- canals; and
- research/monitoring.

To the extent possible, each strategy is broken down into its component activities. Activity descriptions discuss existing program implementation (if any), the parties responsible for implementation (responsible agency, primary role, or assisting role), and a proposed schedule for implementation.

The implementation section details how the entire group of strategies comprising the Water Quality Action Plan will be implemented. It summarizes priorities, implementing agencies, schedules, costs, geographic focus, personnel and equipment requirements, contingency planning for changing budgets, and how Program effectiveness will be evaluated.

## Background

The strategies for the Management Plan, which includes the Water Quality Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important

Table 24. Summary of Water Quality Strategies

Page	Strategies	Overall Sanctuary Priority Level <sup>+</sup>	Planned Level of Action in Year 1 (FY 94) <sup>++</sup>	Months to Complete	Funding for Full Implemen- tation	Number of Activities to be Undertaken	Number of Institutions
<b>210 Florida Bay/External Influence</b>							
210 W 19	Florida Bay Freshwater Flow	High	Medium	36+	100%	2	10
212 W 24	Florida Bay Influence	High	High	48	<50%	3	5
<b>212 Domestic Wastewater</b>							
213 W 1	OSDS Demonstration Project	High	High	36	100%	2	5
214 W 2	AWT Demonstration Project	Medium	Low	36	<50%	2	4
214 W.3	Wastewater Management Systems	High	High	36	<50%	4	8
216 W 4	Wastewater Disposal, City of Key West	High	Low	48	<50%	2	6
217 W 5	Water Quality Standards	Medium	None	60+	<50%	2	4
217 W 6	NPDES Program Delegation	*	--	24	100%	1	2
217 W.7	Resource Monitoring of Surface Discharges	Low	Low	36	100%	1	2
218 W 8	OSDS Permitting	Low	None	36	100%	3	3
219 W 9	Laboratory Facilities	Low	None	36	<50%	2	3
<b>220 Stormwater</b>							
220 W 11	Stormwater Retrofitting	Medium	Low	60+	<50%	2	4
220 W 12	Stormwater Permitting	*	--	0	100%	1	5
221 W 13	Stormwater Management	Medium	Medium	24	100%	2	7
222 W 14	Best Management Practices	Medium	Low	36	<50%	1	8
<b>222 Marinas and Live-Aboards</b>							
223 B 7	Pollution Discharges	Medium	Medium	48	<50%	5	5
224 Z 5	Special-use Areas	Medium	Low	12+	<50%	3	5
225 L 1	Marina Pump-Out	High	Low	60	<50%	3	8
225 L 6	Mobile Pump-Out	Medium	None	36	<50%	1	2
226 L.2	Marina Sitings and Design	Low	None	36	100%	1	3
226 L.3	Marina Operations	Medium	None	36	<50%	3	5
227 E.4	Training/Workshops/School Programs	Medium	Medium	24	<50%	1	2
<b>228 Landfill</b>							
228 L 7	SWD Problem Sites	Medium	None	60+	<50%	3	3
<b>229 Hazardous Material</b>							
229 W 15	HAZMAT Response	Medium	Low	36	<50%	3	5
230 W 16	Spill Reporting	Low	Low	24	<50%	2	3
231 L 10	HAZMAT Handling	Medium	None	36	?	1	4
<b>231 Mosquito Spraying</b>							
231 W 17	Mosquito Spraying	High	High	12	75-99%	4	2
232 W 18	Pesticide Research	High	None	36+	<50%	3	3
<b>233 Canals</b>							
233 W 10	Canal WQ	High	Low	60	<50%	8	5
<b>235 Research and Monitoring</b>							
236 W 20	Monitoring	High	High	60+	<50%	4	2
237 W 21	Predictive Models	High	Low	12+	<50%	2	4
237 W 22	Special Studies Wastewater Pollutants	High	Low	36	<50%	1	4
238 W 23	Special Studies Other Pollutants and WQ Problems	Medium	None	36	75-99%	4	6
238 W 28	Regional Database	High	High	12	100%	3	3
239 W 29	Dissemination of Findings	Medium	Low	60+	<50%	4	3
240 W 32	Technical Advisory Committee	*	--	0	100%	1	3
240 W 33	Ecological Monitoring Program	High	Refer to Research and Monitoring Action Plan				

+ Strategies with an "\*" for Overall Sanctuary Priority Level are already existing programs and/or will be completed in the first year of sanctuary operation

++ Began October 1, 1993

strategies. The medium priority level contains 36 strategies that represent the next level of importance to the Sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Water Quality Strategies.** The Water Quality Action Plan contains 37 strategies. Three of these (NPDES Program Delegation (W.6), Stormwater Permitting (W.12), and Technical Advisory Committee (W.32), will be completed within the first year of Sanctuary operation (Table 24). Of the remainder, 14 are high priority level, 15 are medium priority level, and 15 are low priority level. Consequently, 29 water quality strategies that are included in this plan are expected to be initiated within the first year of Sanctuary operation.

The action plan strategies will be implemented by a combination of Federal, State, and local agencies (Table 25). The EPA and the Florida Department of Environmental Protection (FDEP) will have lead roles in the implementation of most strategies included in this plan. Others, however, such as the South Florida Water Management District (SFWMD), Monroe County, the Florida Department of Health and Rehabilitative Services (FDHRS), and the U.S. Coast Guard (USCG), will have a lead role in implementing selected strategies included within this Plan.

It is expected to cost \$275 million to \$495 million to implement all of the strategies included in this plan (Table 26). However, much of this total (>\$200 million) is accounted for by two very expensive strategies: Wastewater Management Systems (W.3) and Stormwater Retrofitting (W.11). Excluding these two strategies, the total cost of all strategies is \$34 million to \$55 million. Funding for the Program will come from a combination of public (Federal, State, and local) and private institutions. Eighteen government institutions are identified as potential participants in this Program (Table 25).

**Relationship to Other Action Plans.** Many of the strategies within this plan also appear in other action plans. This is a result of the need to establish separate components (i.e., research, education, volunteer) in Sanctuary management. In addition to having a water quality thrust, a strategy may have a research, education, or volunteer component. If a strategy appears in more than one action plan, this is noted at the end of the strategy/activity description. In most cases, the complete description only appears in one action plan.

## Goals and Objectives

The Florida Keys National Marine Sanctuary is the first to include a Water Quality Protection Program. The purpose of the Program is specified in the Florida Keys National Marine Sanctuary and Protection Act:

recommend priority corrective actions and compliance schedules addressing point and nonpoint sources of pollution to restore and maintain the chemical, physical, and biological integrity of the Sanctuary, including restoration and maintenance of a balanced, indigenous population of corals, shellfish, fish and wildlife, and recreational activities in and on the water.

The Program's goals are the protection and improvement of Sanctuary water quality and enhancement of living resources. The Water Quality Protection Program proposes many activities to achieve these goals, such as reducing anthropogenic loading (wastewater and stormwater) to Sanctuary waters. In addition to corrective actions, the Program also includes development of a water quality monitoring program and a special studies program, as well as a provision for opportunities for public participation in all aspects of the Program's development and implementation.

## Existing Programs

The Florida Keys National Marine Sanctuary is the first to have a Water Quality Protection Program. There are no existing programs at the Key Largo or Looe Key National Marine Sanctuaries that focus specifically on water quality, although Sanctuary education programs typically include water quality among the many environmental issues they address.

Many of the strategies included in the Water Quality Action Plan involve the modification of existing programs operated by one or more of the agencies with jurisdiction over water quality in the Florida Keys. Other strategies involve entirely new programs, but these would necessarily build upon the existing regulatory/management framework. Further information about existing programs operated by agencies and institutions with jurisdiction over water quality in the Florida Keys is provided in the Water Quality Protection Program Phase II Report, available from the U.S. Environmental Protection Agency.

Where appropriate, descriptions of strategies and activities in the Water Quality Action Plan include a section describing "Existing Program Implementation."

As specified in the Act, the Water Quality Protection Program was developed by the EPA and the FDEP, working in close coordination with the National Oceanic and Atmospheric Administration. The Program was developed in two phases. During Phase I, information was compiled and synthesized on the status of the Sanctuary's natural environment. Priority problems were identified through this literature review, and through consensus of technical experts and other participants in technical workshops. Phase II focused on developing options for corrective action, developing a water quality monitoring program and associated research/special studies program, and developing a public education and outreach program. Findings from Phases I and II were incorporated into the Water Quality Protection Program Document. Options for corrective action, research, monitoring, and education presented in the Program Document were incorporated into the strategies included in this action plan.

## Description of Strategies

### Florida Bay/External Influence Strategies

Severe water quality and ecological problems have developed in Florida Bay in recent years, and the Bay is now in a state of crisis. Problems include a massive seagrass die-off; phytoplankton blooms; sponge die-offs; mangrove die-backs; and all of the potential cascading ecological effects of these phenomena. Since 1987, much of Florida Bay has been affected by a massive, unprecedented seagrass die-off that has left tens of thousands of acres of denuded sediments. Through the resulting sediment suspension and nutrient release, the seagrass die-off may be the cause of massive phytoplankton blooms which have affected the Bay during recent years. Sponge die-offs caused by phytoplankton blooms may have serious impacts on juvenile spiny lobsters, which reside by day under sponges for protection from predation.

Most scientists believe that recent ecological problems in Florida Bay are the result of long-term reduction in freshwater flow from the Everglades. The mechanism has not been documented, but high salinities per se and a long-term change from an estuarine to a marine system may be contributing factors.

These problems in Florida Bay must be viewed as a potential threat to water quality and resources in the

Sanctuary. Water quality and natural resources in Florida Bay are tightly linked to those of the Sanctuary. The need for action to deal with water delivery problems in Florida Bay has been strongly stressed by workshop participants and other scientists during the development of the Water Quality Protection Program. Two strategies were developed to address this issue: one (W.19) would have the Steering Committee for the Water Quality Protection Program take a leading role in working to restore historical freshwater flow to Florida Bay; the other (W.24) would conduct research that will further document the influence of Florida Bay on water quality and biological resources in the Sanctuary. The research on Florida Bay influence should supply additional scientific evidence to support the need for action.

### Strategy W.19: Florida Bay Freshwater Flow

The Steering Committee for the Water Quality Protection Program shall take a leading role in restoring historical freshwater flow to Florida Bay, which is now in a state of crisis. In addition, Sanctuary representatives shall work with appropriate Federal, State, and local agencies to ensure that restoration plans and surface-water improvement and management plans for South Florida and the Everglades are compatible with efforts to maintain water quality within the Sanctuary.

*(Priority Level High, Medium Level of Action in Year 1, 36+ Months to Complete, 100% Funding Available for Full Implementation)*

**Activity 1-Establish a Leading Role for the Steering Committee.** The Steering Committee for the Water Quality Protection Program includes high-level representatives of all relevant agencies, and can

### Florida Bay/External Influence Strategies

#### W.19: Florida Bay Freshwater Flow

- Establish leading role for the Steering Committee
- Participate in a review/revision of water management strategies

#### W.24: Florida Bay Influence

- Conduct historical assessment
- Conduct circulation studies
- Conduct ecological studies

therefore take a leading role in water management issues affecting Florida Bay, including restoring historical freshwater flow. Both short- and long-term solutions must be pursued at high levels of management in both State and Federal agencies.

■**Implementation** The responsible agencies will be the EPA and FDEP, which administer the Water Quality Protection Program. All other agencies represented on the Steering Committee will have a primary role, including NOAA, the National Park Service (NPS), the U.S. Fish and Wildlife Service (FWS), the U.S. Army Corps of Engineers (USACE), the Florida Department of Community Affairs (FDCA), the SFWMD, and the Florida Keys Aqueduct Authority (FKAA).

■**Schedule** This activity has been completed.

**Activity 2-Participate in a Review/Revision of Water Management Strategies.** Sanctuary representatives shall participate in the review and revision of restoration plans and water management plans for Florida Bay and adjacent areas to ensure that these proposals and/or actions will enhance and complement water quality improvement efforts undertaken in the Sanctuary. These plans include, but are not limited to, the Shark River Slough GDM, C-111 basin, Taylor Slough Restoration, West Dade Wellfield, US 1 widening, National Park Service Everglades Restoration Plan, Lower East Coast Water Supply Plan, and Everglades Surface Water Management and Improvement Plan.

■**Implementation** The Management Committee of the Water Quality Protection Program is responsible for

### Ongoing Efforts to Restore the South Florida Ecosystem

During the same time that this Management Plan was developed, several Federal and State initiatives were begun, largely at the urging of Sanctuary Advisory Council members, to restore the entire South Florida ecosystem, from the Kissimmee River through the Florida Keys.

#### South Florida Ecosystem Restoration Task Force

In June 1993, Secretary of the Interior Bruce Babbitt implemented an interagency initiative to address the environmental problems in South Florida and Florida Bay. In September 1993, an Interagency Agreement on South Florida Ecosystem Restoration was signed, formally establishing the South Florida Ecosystem Restoration Task Force. The members of the Task Force are the assistant secretaries of the Departments of Agriculture, the Army, Commerce, Interior, Justice, and the Environmental Protection Agency. Plans are to include the Federal Highway Administration in the Agreement during the restoration effort. In addition, the State of Florida and the Tribes are members of the Task Force. A list of the current membership is included in Appendix B. The agreement specified that the Task Force do the following:

- agree on the Federal objectives for restoring the South Florida ecosystem;
- promote the establishment of an ecosystem-based science program that utilizes the strengths of public and private entities and includes research, inventory, monitoring, and modeling;
- support the development of appropriate multi-species recovery plans for threatened and endangered species and other species proposed for listing as threatened or endangered; and
- encourage the expedited implementation of projects, programs, and activities included in the coordinated plans for the environmental restoration and maintenance of the South Florida ecosystem.

The ultimate objective of the Task Force is to develop a restoration plan for the entire South Florida ecosystem.

The Task Force established an 11-member Interagency Working Group to formulate and recommend management policies, strategies, plans, programs, and priorities for ecosystem restoration and maintenance to the Task Force.

#### Science Plan for Florida Bay

The development of a comprehensive research and monitoring plan for Florida Bay, another interagency effort, has been occurring at the same time as the development of the FKNMS Draft Management Plan/EIS, Water Quality Protection Program, and the South Florida Ecosystem Restoration Report. In January 1993, the Everglades National Park research staff convened an interagency group of managers and scientists to review their research plan for Florida Bay. This group informally became the Florida Bay Interagency Working Group, with the responsibility for developing the Science Plan for Florida Bay that was released in April 1994. The final draft of this plan was developed by scientists from the National Park Service, National Biological Survey, NOAA, South Florida Water Management District, and Florida Department of Environmental Protection, following a series of interagency reviews.

#### Governor's Commission for a Sustainable South Florida

By Executive Order, Florida Governor Lawton Chiles established a "Commission for a Sustainable South Florida" on March 3, 1994. The Commission, which has representatives from various local, State, and Federal agencies, the Tribes, as well as other public and private interests in the region, was created to "develop recommendations and public support for regaining a healthy South Florida ecosystem with a sustainable economy and communities."

administering water quality management in the Sanctuary. The responsible agencies will be the EPA and FDEP, which administer the Water Quality Protection Program. NOAA will have a primary role because of its overall responsibility for managing the Sanctuary. The main agencies involved in water management decisions for the Everglades and Florida Bay are the NPS, SFWMD, and USACE. As the State land-planning agency for a designated Area of Critical State Concern, the FDCA is also likely to be involved. Other primary agencies are the FWS and Monroe County.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 36+ months to complete.

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### **Strategy W.24: Florida Bay Influence**

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Conduct research to understand the effect of water transport from Florida Bay on water quality and resources in the Sanctuary.

*(Priority Level High, High Level of Action in Year 1, 48 Months to Complete, <50% Funding Available for Full Implementation)*

#### **Activity 1-Conduct an Historical Assessment.**

This activity will involve an historical assessment of Everglades/Florida Bay/Florida Keys hydrology, as it has affected water quality and biological communities in the Sanctuary. It will clarify the role of freshwater inflows and water quality from the Everglades and other freshwater discharges to the southwest shoreline of Florida, to Florida Bay and the Sanctuary. The activity will examine the effects of structural modifications and changes in timing and volume of freshwater releases from existing structures, as well as land-based practices affecting the water quality of runoff.

■**Implementation.** The SFWMD and the NPS will be the responsible agencies for this strategy. Assistance will be provided by USACE, which has historical data concerning water management activities affecting the Everglades and Florida Bay.

■**Schedule.** This activity will have a high level of action in year 1. It will require 12 months to complete.

**Activity 2-Conduct Circulation Studies.** This activity will involve circulation studies to estimate present-day, long-term net transport and episodic

transport from Florida Bay to the Sanctuary. Studies of groundwater flow may be included.

■**Implementation.** The EPA and FDEP will be the responsible agencies for this strategy.

■**Schedule.** This activity will have a high level of action in year 1. It will require 48 months to complete.

**Activity 3-Conduct Ecological Studies.** This activity will involve studies to document ecological impacts, if any, of Florida Bay waters on Sanctuary communities including seagrasses, coral reefs, nearshore hardbottom communities, and potentially endangered or threatened species. Documentation of potential impacts could provide a stronger basis for action to restore historical freshwater flow to Florida Bay.

■**Implementation.** The EPA and the FDEP will be the responsible agencies for this strategy.

■**Schedule.** This activity will have a low level of action in year 1. It will require 36 months to complete.

***This strategy is also included in the Research and Monitoring Action Plan.***

### **Domestic Wastewater Strategies**

This section describes strategies for reducing pollution from land-based sources of domestic wastewater. Pollution sources include cesspits, on-site disposal systems (OSDS), package plants, and municipal treatment plants. Strategies for reducing wastewater pollution from live-aboard boaters are covered in the Marina and Live-aboard section of this action plan.

The first two domestic wastewater strategies (W.1 and W.2) are demonstration projects that would provide information to decide among options for the main engineering strategy (W.3) for wastewater management systems outside Key West. Strategy W.4 is also an engineering strategy, but is applicable only to Key West. The remaining domestic wastewater strategies involve management activities designed to reduce pollution by developing water quality standards (including biocriteria) specific to the Florida Keys, and making the regulatory/management system work more efficiently.



**Domestic Wastewater Strategies****W.1: OSDS Demonstration Project**

- Select alternate OSDS and test locations
- Conduct an OSDS demonstration project

**W.2: AWT Demonstration Project**

- Select specific technology and test location
- Conduct AWT pilot project

**W.3: Wastewater Management Systems**

- Establish inspection/compliance programs for cesspits, OSDS, and package plants
- Evaluate development of nutrient reduction targets
- Develop sanitary wastewater master plan
- Implement master plan

**W.4: Wastewater Disposal, City of Key West**

- Evaluate Disposal and reuse options
- Upgrade effluent disposal

**W.5: Water Quality Standards**

- Develop and evaluate indicators
- Develop water quality standards

**W.6: NPDES Program Delegation**

- Delegate NPDES program

**W.7: Resource Monitoring of Surface Discharges**

- Require resource monitoring

**W.8: OSDS Permitting**

- Improve interagency coordination
- Combine OSDS permitting responsibilities
- Monitor revised OSDS rules

**W.9: Laboratory Facilities**

- Conduct feasibility study
- Establish interagency laboratory

This strategy will provide information to help determine the appropriate role, if any, of alternate OSDS (septic systems) in wastewater management in the Keys. Although some alternate OSDS designs appear promising, it is not appropriate to proceed with broad-scale installation of these systems until an independent evaluation has been conducted.

**Activity 1-Select Alternate OSDS and Test Locations** Alternate OSDS designs will be reviewed, and appropriate systems will be selected for evaluation. Suitable test locations will be selected.

■ **Implementation** The Florida Department of Health and Rehabilitative Services (FDHRS) will be the responsible agency for this activity. Other primary agencies involved will be the EPA, FDEP, FDCA, and Monroe County.

■ **Schedule** This activity has been completed.

**Activity 2-Conduct an OSDS Demonstration Project.** Alternate OSDS designed for nutrient removal would be installed and maintained in a manner consistent with actual residential use. Influent, effluent, and groundwater quality (both background and "down-gradient") would be monitored at regular intervals for at least a year. In addition to nutrient-removal efficiency, the study would evaluate maintenance and inspection requirements to keep units operating properly.

■ **Existing Program Implementation.** Congress provided \$500,000 in additional funds to EPA's fiscal year 1993 budget for the Water Quality Protection Program to be used for demonstration projects. This was used to initiate the OSDS Demonstration Project (strategy W 1) before the fiscal year 1994 starting point for this action plan.

■ **Implementation** The FDHRS will be the responsible agency for this activity. Other primary agencies involved will be the EPA, FDEP, FDCA, and Monroe County.

■ **Schedule** This activity will have a low level of action in year 1. It will require 36 months to complete.

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**Strategy W.1:  
OSDS Demonstration Project**

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Conduct a demonstration project to evaluate innovative alternate, nutrient-removing OSDS  
(Priority Level High, High Level of Action in Year 1,  
36 Months to Complete, 100% Funding Available for  
Full Implementation)

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### Strategy W.2: AWT Demonstration Project

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Conduct a pilot project to evaluate installation of a small, expandable AWT plant to serve an area of heavy OSDS use with associated water quality problems.

*(Priority Level Medium, Low Level of Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)*

This strategy will provide information to help decide whether elimination of OSDS would improve water quality in areas believed to be degraded by OSDS-related nutrients. Existing OSDS in the test area would be connected to a small package plant providing advanced wastewater treatment (AWT), which includes nutrient removal. The project will also provide information about the long-term performance of small AWT systems and septic tank effluent pumps or other collection systems. Both conventional and innovative technologies will be considered.

**Activity 1-Select Specific Technology and Test Location.** Different technologies for AWT will be reviewed and appropriate systems will be selected for evaluation. Preferably, the test area will be one where water quality problems believed to be related to OSDS nutrients have already been identified. In addition, the location should be appropriate for eventual expansion of the AWT package plant to a community or subregional plant if the test proves successful.

■ **Implementation.** The FDHRS will be the responsible agency for this activity. The EPA, FDEP, and Monroe County will be involved as primary agencies.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 2-Conduct an AWT Pilot Project.** A small, expandable AWT package plant will be installed to serve an area where there is high-density OSDS use in close proximity to confined waters. Initial background groundwater and surface water monitoring will be conducted, and plant influent and effluent will then be monitored for at least one year after the plant is in operation. Groundwater and surface-water monitoring will be continued for three to five years. Most facilities constructed for the project could be incorporated into a larger system if results are favorable.

■ **Implementation.** The FDHRS will be the responsible agency for this activity. The EPA, FDEP, and Monroe County will be involved as primary agencies.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

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### Strategy W.3: Wastewater Management Systems

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Establish authority for and implement inspection/enforcement programs to identify all cesspits, and enforce existing standards for all OSDS and package plants. Evaluate the development of targets for reductions in wastewater nutrient loadings necessary to restore and maintain water quality and Sanctuary resources. Develop and implement a Sanitary Wastewater Master Plan that evaluates options for upgrading existing systems beyond current standards or constructing community sewage treatment plants, based on nutrient reduction targets, cost and cost effectiveness, reliability/compliance considerations, and environmental and socioeconomic impacts.  
*(Priority Level High, High Level of Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Establish Inspection/Compliance Programs for Cesspits, OSDS, and Package Plants.** This activity would establish on-site inspection programs to identify all cesspits and ensure that OSDS and package plants are in compliance with existing standards. Inspection/enforcement programs for OSDS and package plants would ensure that these systems are operating properly, reducing nutrient loading to groundwater. Cesspits identified through this activity would eventually be replaced with an approved OSDS or a connection to a community wastewater treatment plant, as determined by the Sanitary Wastewater Master Plan (described in Activity 3). This would reduce nutrient loading to groundwater and eliminate health hazards from untreated sewage. Because development and implementation of the Sanitary Wastewater Master Plan is a long-term process, Monroe County should develop an interim response policy to address non-compliance wastewater treatment systems as part of this activity. This activity will also include a public education/outreach component which would inform the public about ways to assess and improve existing wastewater treatment systems.

■ **Implementation.** The FDHRS will be the responsible agency. Other primary agencies involved will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 36 months to complete.

**Activity 2-Evaluate Development of Nutrient Reduction Targets.** The goal of this activity is to identify and evaluate alternative strategies for developing nutrient reduction targets for wastewater and stormwater in the Sanctuary. The information will help the EPA and the State of Florida to determine whether nutrient reduction targets should be developed and if so, how development should proceed.

■ **Implementation.** The EPA and FDEP will conduct this activity.

■ **Schedule.** This activity is in progress and will require 12 months to complete.

**Activity 3-Develop Sanitary Wastewater Master Plan.** This activity will develop a Sanitary Wastewater Master Plan to evaluate options for wastewater treatment developed in the EPA Water Quality Protection Program Phase II Report. The options (using the numbering system in that report) are as follows:

- **W3a:** Upgrade existing systems to current standards
- **W3b:** Upgrade package plants to AWT;
- **W3c:** Upgrade package plants to AWT and OSDS to alternate nutrient-removing systems;
- **W3d:** Construct AWT plants for Key Largo and Marathon (the two most populous communities in the Upper and Middle Keys), and extend the service area for the Key West treatment plant to adjacent areas of the Lower Keys, to treat 52 percent of wastewater flows outside the City of Key West;
- **W3e:** Construct seven community wastewater treatment plants for the most densely populated areas, to treat 73 percent of wastewater flows outside the City of Key West;
- **W3f:** Construct 12 community wastewater treatment plants, to treat 94 percent of wastewater flows outside the City of Key West; and

- **W3g:** Construct three subregional wastewater treatment plants, to treat 94 percent of wastewater flows outside the City of Key West.

Currently, these options can be evaluated partially on the basis of estimated cost, cost effectiveness, nutrient reduction, and reliability of the technologies involved. However, the options should also be evaluated in light of the nutrient-reduction targets which may be developed under Activity 2. In addition, information about the nutrient removal capacity, cost and cost effectiveness, and reliability of alternate, nutrient-removing OSDS and various conventional and innovative AWT technologies needs to be considered; this information will come from the OSDS Demonstration Project (strategy W.1) and the AWT Demonstration Project (strategy W.2). Environmental and socioeconomic impacts must also be analyzed. The Sanitary Wastewater Master Plan will also specify details of costs, schedules, service areas, etc. for implementation. The master plan should investigate the feasibility of wastewater utility districts and other alternative funding mechanisms.

■ **Implementation.** FDEP and EPA will be the responsible agencies. FDHRS and Monroe County will also be involved as primary agencies.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 4-Implement a Master Plan.** This activity will implement the preferred wastewater treatment option specified in the Sanitary Wastewater Master Plan developed under Activity 3. The eventual preferred option cannot be identified at this time. However, two options are discussed below as examples.

**Option W3d-Construct Two Community Plants.** Advanced wastewater treatment plants would be constructed for Key Largo and Marathon (the two most populous communities in the Upper and Middle Keys), and the service area for the Key West treatment plant would be extended to adjacent areas of the Lower Keys. This would provide a high level of treatment for about 52 percent of the wastewater flows outside Key West. Estimated Keys-wide reductions in wastewater nutrient loadings are 43 percent for total nitrogen, and 28 percent for total phosphorus. Much greater reductions (80 to 91 percent for nitrogen and 50 to 83 percent for phosphorus) would be achieved in the Key Largo and Marathon service areas, where cesspits, OSDS, and package plants would be replaced by the new community plants.

■**Implementation.** The responsible agency for this option has not been determined. Prior to constructing community wastewater treatment plants, it will be necessary to identify an agency to serve as a wastewater utility. Candidates include the Florida Keys Aqueduct Authority (FKAA), which already has the authority, and Monroe County (administrative capability only, or both administrative and operational capabilities). Other primary agencies likely to be involved are the EPA, FDEP, FDCA, and the Florida Department of Transportation (FDOT). The FDHRS may have an assisting role.

■**Schedule.** This activity will have no action in year 1. Time to complete is unknown.

**Option W3b-Upgrade Package Plants to AWT.** All package plants would be upgraded to AWT. Coupled with elimination of cesspits and enforcement of existing standards for OSDS, this option would reduce wastewater nutrient loadings to groundwater Keys-wide by about 27 percent for nitrogen and 24 percent for phosphorus. The cost would be much less than for option W3d. However, this option would not provide any additional nutrient reduction from OSDS (including cesspits eventually replaced by OSDS), which are the leading source of wastewater nutrients.

■**Implementation.** The FDEP and EPA will be the responsible agencies. Monroe County will also be involved as a primary agency, and the FDHRS may have an assisting role.

■**Schedule.** This activity will have no action in year 1. Time to complete is unknown.

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#### **Strategy W.4: Wastewater Disposal, City of Key West**

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Upgrade effluent disposal for the City of Key West wastewater treatment plant. Evaluate deep-well injection, including the possibility of effluent migrating through the boulder zone into Sanctuary waters. Evaluate options for the re-use of effluent, including irrigation and potable re-use. Discontinue use of ocean outfall and implement deep-well injection, aquifer storage, and/or re-use. Implement nutrient reduction technologies for effluent prior to disposal or re-use.

*(Priority Level High, Low Level of Action in Year 1, 48 Months to Complete, <50% Funding Available for Full Implementation)*

#### **Activity 1-Evaluate Disposal and Re-use Options.**

Before use of the ocean outfall is discontinued, both the environmental aspects of deep-well injection and the economics of effluent re-use need to be evaluated thoroughly. Studies of deep well injection need to investigate the possibility of effluent migrating through the boulder zone into Sanctuary waters. Re-use options to be evaluated include irrigation and further treatment to produce potable water. Re-use for local irrigation may be limited due to the small number of application sites. Re-use for irrigation in areas outside the Florida Keys would be considered only if it were proposed for unincorporated Monroe County. Potable re-use, although requiring costly treatment, might be cost-effective in the long term, considering the current cost of treating and pumping in drinking water from Florida City.

■**Implementation.** The responsible agency will be the City of Key West or possibly FKAA (if selected as the Keys-wide wastewater utility). Other primary agencies involved will be the FDEP, EPA, FDCA, and Monroe County.

■**Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 2-Upgrade Effluent Disposal.** Use of the ocean outfall would be discontinued (except in emergencies), and effluents would be disposed of through deep-well injection, aquifer storage, and/or re-use as appropriate based on results of the preceding activity. This strategy would reduce direct nutrient loadings to surface waters from the Key West wastewater treatment plant.

■**Implementation.** The responsible agency will be the City of Key West or possibly FKAA (if selected as the Keys-wide wastewater utility). Other primary agencies involved will be the FDEP, EPA, FDCA, and Monroe County.

■**Schedule.** This activity will have no action in year 1. It will require 48 months to complete.

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### Strategy W.5: Water Quality Standards

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Develop and implement water quality standards, including biocriteria, appropriate to Sanctuary resources.

*(Priority Level Medium, No Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Develop and Evaluate Indicators.** This activity will identify and evaluate indicators (biochemical and ecological measures to provide early warning of widespread ecological problems) in each type of ecosystem. Examples are tissue C:N:P ratios, alkaline phosphatase activity, and shifts in community structure by habitat. These measures could be incorporated into the Water Quality Monitoring Program, and could provide the basis for resource-oriented water quality standards (biocriteria) for the Sanctuary.

■**Implementation.** The EPA and FDEP will be the responsible agencies for this strategy through the Research/Special Studies Program. In addition to the FDEP and EPA, NOAA/National Marine Fisheries Service (NMFS) may have a role in this research.

■**Schedule.** This activity will have a low level of action in year 1. It will require 36 months to complete.

**Activity 2-Develop Water Quality Standards.** This activity will develop water quality standards, including nitrogen and phosphorus standards and biocriteria, appropriate to Sanctuary resources (corals and seagrasses). This activity will reduce impacts of pollution on Sanctuary resources by determining water quality conditions to ensure resource protection. The intent is to implement water quality standards as guidance in determining permitted discharge limitations. Outstanding Florida Waters (OFW) standards will be used until research indicates that new, more stringent regulations are necessary.

■**Implementation.** The responsible agency for changes to the state's water quality standards will be FDEP. The FDEP would need to initiate formal rule-making in accordance with Chapter 120FS - Administrative Procedures Act. Once enacted, the new standards would be implemented at the time new permits were being issued or existing permits reissued. Other primary agencies involved in developing the standards will be the EPA and FDHRS.

■**Schedule.** This activity will have no action in year 1. It will require 60+ months to complete.

This strategy is also included in the Research and Monitoring Action Plan.

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### Strategy W.6: NPDES Program Delegation

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Delegate administration of the National Pollutant Discharge Elimination System (NPDES) program for Florida Keys dischargers to the State of Florida.  
*(Completed in Year 1)*

**Activity 1-Delegate the NPDES Program.** Under this activity, the EPA delegated NPDES permitting authority to the State of Florida, as has been done in many other states. This simplifies the permitting process for surface water dischargers by removing the need to apply for permits from both the EPA and FDEP.

■**Implementation.** This activity was implemented by the EPA and FDEP in 1995. The EPA administers the NPDES permitting program and has the authority to delegate it to the states. FDEP submitted an application to the EPA to have the program delegated. The two agencies entered into a memorandum of understanding (MOU) defining agency roles and responsibilities for NPDES permitting in Florida.

■**Schedule.** This activity has been completed.

**This strategy is also included in the Regulatory Action Plan.**

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### Strategy W.7: Resource Monitoring of Surface Discharges

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Require all NPDES-permitted surface dischargers to develop resource monitoring programs, including biological monitoring where appropriate.  
*(Priority Level Low, Low Level of Action in Year 1, 36 Months to Complete, 100% Funding Available for Full Implementation)*

**Activity 1-Require Resource Monitoring.** This activity would help to evaluate environmental impacts of point source discharges by requiring all

NPDES-permitted surface dischargers to develop resource monitoring programs. This could be accomplished in one of two ways. One way would be for EPA to eliminate the baseline exemption for resource monitoring under the Ocean Discharge Program, as it applies to the Florida Keys. All surface dischargers, except the City of Key West sewage treatment plant, are currently exempted from developing resource monitoring programs because the end of their discharge pipe does not extend beyond the baseline (the mean low-tide line). A second way to accomplish the same goal would be for the FDEP, through the State of Florida's permitting authority, to require resource monitoring when individual NPDES permits come up for renewal. This approach probably would be easier, because it can be accomplished under existing rules. Eliminating EPA's baseline exemption would require a Federal rule change.

■**Implementation.** The EPA and FDEP are the responsible agencies for this activity. The EPA could eliminate the baseline exemption as it applies to the Florida Keys. Alternatively, the FDEP could require resource monitoring as individual NPDES permits come up for renewal. The FDEP has the authority to require biological/resource monitoring under existing NPDES regulations.

■**Schedule.** This activity will have a low level of action in year 1. It will require 36 months to complete.

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### **Strategy W.8: OSDS Permitting**

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Improve interagency coordination for industrial wastewater discharge permitting. Combine OSDS permitting responsibilities in one agency for commercial establishments, institutions, and multi-family residential establishments utilizing injection wells. *(Priority Level Low, No Action in Year 1, 36 Months to Complete, 100% Funding Available for Full Implementation)*

**Activity 1-Improve Interagency Coordination.** This strategy would improve coordination among the EPA, FDEP, and local government relative to industrial wastewater discharge permitting and tracking (the FDHRS is included for special cases, such as seafood processing plants discharging into septic systems). At present, much of the interagency coordination and tracking is handled through a series of memoranda of agreement (MOAs) and MOUs. These agreements would be reviewed, evaluated,

and revised specifically for the Florida Keys. This could also indirectly reduce wastewater pollution by refining and simplifying the OSDS permitting process, and increasing funds for compliance monitoring and enforcement.

■**Implementation.** The responsible agency will be the FDEP, which will work through the Intergovernmental Coordinating Council to review existing MOAs and MOUs. Other primary agencies involved will be the EPA and FDHRS. No new rules or governmental structures will be required to implement this activity.

■**Schedule.** This activity will have no action in year 1. It will require 24 months to complete.

**Activity 2-Combine OSDS Permitting Responsibilities.** This activity would combine FDEP and FDHRS permitting responsibilities for commercial establishments, institutions, and multi-family residential establishments into one agency. Currently, for commercial establishments, institutions, and multi-family residential uses with total daily flows of less than 5,000 gallons, the Monroe County Public Health Unit is authorized to permit the aerobic treatment unit and the filter unit, whereas the FDEP permits the injection well (borehole). However, effluent from these aerobic systems does not meet the more stringent wastewater treatment standards of the FDEP.

■**Implementation.** The FDEP would be the responsible agency, working closely with the FDHRS. The two agencies would enter into an MOU delineating their respective roles and responsibilities. The agencies would need to agree on establishing the same level of treatment requirements for existing and new or innovative OSDS units to be permitted in the Florida Keys. Once agreement is reached, the administrative rules regarding the quality of wastewater being discharged into injection wells would be amended.

■**Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 3-Monitor Revised OSDS Rules.** This activity will involve designing and implementing a monitoring program to determine the effectiveness of recent revisions in Part II of Chapter 10D-6 Florida Administrative Code (FAC). Effective March 1992, the FDHRS implemented two key rule changes specifically targeting the Florida Keys. One change makes the use of Class V underground injection wells (boreholes) an option of last resort. The other requires the placement of a 12-inch-thick (at a

minimum) filter layer of quartz sand below the drainfield absorption surface of the OSDS. Data are needed to evaluate whether these changes are achieving their desired effect.

■**Implementation.** The responsible agency will be the FDHRS, with primary responsibility assigned to the Environmental Administrator of the State Health Office. The Monroe County Public Health Unit Environmental Health Section would provide field staff. The change requires a 12-inch-thick filter layer of quartz sand, so it will be necessary to find homeowners with existing OSDS who are willing to serve as a control group.

■**Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 2-Establish Interagency Laboratory.**

Depending on the outcome of Activity 1 this activity would create an interagency laboratory facility for processing compliance monitoring samples.

■**Implementation.** The FDEP would be the responsible agency, working with the FDHRS and possibly Monroe County.

■**Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

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**Strategy W.9:  
Laboratory Facilities**

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Evaluate the feasibility of, and if appropriate, establish an interagency laboratory capable of processing monitoring and compliance samples.

*Priority Level Low, No Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Conduct Feasibility Study.** This activity would evaluate the feasibility of creating an interagency laboratory facility in the Keys for processing compliance monitoring samples. Neither the FDEP nor the FDHRS has FDHRS-certified (or equivalent) laboratory facilities in the Keys. Because of quality control considerations (holding times), it is difficult or impossible to ship compliance/enforcement samples to Tallahassee for analysis, and use of contracted private laboratory facilities is expensive. The agencies should jointly evaluate the feasibility of establishing a laboratory facility certified by FDHRS or by the quality assurance section of FDEP. The laboratory would be located in the FDEP office building in Marathon and would not process toxics or status and trends samples from the water quality monitoring program.

■**Implementation.** The FDEP would be the responsible agency, working with the FDHRS and possibly Monroe County.

■**Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

## Stormwater Strategies

This section describes four strategies for reducing pollution from stormwater runoff in the Keys. The first (W.11) would involve engineering modification of hot spots to control pollutants in stormwater runoff. The next two strategies (W.12 and W.13) work together to require enactment of stormwater management ordinances and master plans that would cover the entire Keys. The fourth (W.14) involves the development and implementation of widely used Best Management Practices and a public education program to reduce pollutants entering stormwater runoff.

### Stormwater Strategies

#### W.11: Stormwater Retrofitting

- Inventory stormwater hot spots
- Retrofit hot spots and portions of US 1

#### W.12: Stormwater Permitting

- Eliminate permitting threshold

#### W.13: Stormwater Management

- Develop and enact stormwater ordinances and master plans on a continuing, county-wide basis
- Petition EPA to include the Florida Keys in the stormwater NPDES program

#### W.14: Best Management Practices

- Develop and Implement Best Management Practices and a public education program

### Strategy W.11: Stormwater Retrofitting

Identify and retrofit stormwater hot spots using Best Management Practices, such as grass parking, swales, pollution control structures, and detention/retention facilities. Control stormwater runoff in areas handling toxic and hazardous materials. Install swales and detention facilities along limited sections of US 1.

*(Priority Level Medium, Low Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Inventory Stormwater Hot Spots.** This activity would involve identifying stormwater hot spots for possible engineering modification (retrofitting).

Currently, no hot spots specifically attributable to stormwater runoff have been identified, although stormwater runoff may be a contributing factor in some identified hot spots.

■ **Implementation.** Monroe County will be the responsible agency. Other primary agencies involved will be the FDEP, Florida Department of Transportation (FDOT), and SFWMD.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

#### Activity 2-Retrofit Hot Spots and Portions of U.S.

**1.** This activity will involve using grass parking, swales, pollution control structures, and detention/retention facilities to control pollutants in stormwater runoff. Hot spots would be identified in Activity 1. Swales and detention facilities would be installed along portions of US 1. Engineering actions would be taken to control stormwater runoff in areas handling toxic and hazardous materials.

■ **Implementation.** Monroe County will be the responsible agency for stormwater retrofitting. Other primary agencies involved will be the FDEP, FDOT, and SFWMD.

■ **Schedule.** This activity will have no action in year 1. It will require 60+ months to complete.

### Strategy W.12: Stormwater Permitting

Require that no development in the Florida Keys be exempted from the stormwater permitting process.  
*(Completed in Year 1)*

**Activity 1-Eliminate Permitting Threshold.** The SFWMD, which currently has primary responsibility for stormwater permitting in the Florida Keys, exempts developments of fewer than 10 acres in size, or two acres of impervious surface, from having to obtain a stormwater permit. Most developments in the Keys fall below this threshold. Local governments are in the process of developing stormwater management ordinances and/or stormwater management master plans. This strategy would require that local government ordinances and master plans cover all developments, with no exemptions from the stormwater permitting process.



■ **Existing Program Implementation.** Monroe County's stormwater management ordinance is in place and addresses everything that falls below the SFWMD permitting threshold. The City of Key West's Land Development Regulations also address developments that fall below the SFWMD permitting threshold.

■ **Implementation.** Each local government (Monroe County and the municipalities) will be responsible for implementing its own ordinance within its jurisdictional limits. As the State land planning agency for a designated Area of Critical State Concern, the FDCA has an oversight responsibility to ensure that local development regulations adequately protect the area's natural resources and are consistent with those of their neighbors. The SFWMD will provide technical assistance in the development of stormwater ordinances and master plans.

■ **Schedule.** This activity is in progress.

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### Strategy W.13: Stormwater Management

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Require local governments to enact and implement stormwater management ordinances and comprehensive stormwater management master plans. Petition the EPA to include the Florida Keys in the stormwater NPDES program, if adequate stormwater management ordinances and administrative capability to manage such ordinances are not in place by a certain date.

*(Priority Level Medium, Medium Level of Action in Year 1, 24 Months to Complete, 100% Funding Available for Full Implementation)*

This strategy would help to reduce stormwater pollutant loadings (e.g., sediment, toxics, and nutrients) by requiring local governments to develop stormwater management ordinances and master plans. Currently, there is little regulation of stormwater runoff in the Keys. Many developments were constructed before SFWMD stormwater permitting requirements were in place or, if constructed more recently, they fell below the acreage thresholds for those regulations. Monroe County recently passed a stormwater ordinance, and other local governments are either developing ordinances and/or have stated in their comprehensive plans that stormwater management master plans will be developed.

**Activity 1-Develop and Enact Stormwater Ordinances and Master Plans on a Continuing, County-Wide Basis.** Under this activity, local governments would enact ordinances and master plans to control pollutants in stormwater runoff.

■ **Implementation.** Each local government (Monroe County and the municipalities) will be responsible for developing its own stormwater management ordinance. Subsequent modifications to each ordinance may be necessary once each local government adopts its stormwater management master plan. Under authorities of Sections 163.3161 and 380.05 FS, the FDCA has responsibility for ensuring that programs and regulatory rules enacted by local governments in Monroe County are consistent with the legislative growth management principles described in the above-mentioned sections of the Florida Statutes. The SFWMD may provide technical assistance in the development of stormwater ordinances and master plans.

■ **Schedule.** This activity will have a medium level of action in year 1. It will require 12 months to complete.

**Activity 2-Petition EPA to Include the Florida Keys in the Stormwater NPDES Program.** This activity would provide an alternate means of controlling stormwater pollutants in the Keys. It would be implemented only if adequate local stormwater-management ordinances, and administrative capability to manage such ordinances, are not in place by the deadlines established under Activity 1.

■ **Implementation.** The responsible agency will be the FDEP, which would petition the EPA to include the Keys in the stormwater NPDES program for separate municipal storm sewer systems. Monroe County (including its municipalities) currently falls below the population threshold that would trigger the county's inclusion in the stormwater NPDES program. However, states may petition EPA to include a local government in the program.

■ **Schedule.** This activity will have no action in year 1. It will require 24 months to complete.

### Strategy W.14: Best Management Practices

Institute a series of Best Management Practices and a public education program to prevent pollutants from entering stormwater runoff.

*(Priority Level Medium, Low Level of Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)*

#### **Activity 1-Develop and Implement Best Management Practices and a Public Education Program.**

This activity would reduce pollution from stormwater runoff through a variety of programs, including street sweeping; ordinances aimed at controlling fertilizer application on public and private landscaping; collection locations and a public education program for the proper use and disposal of fertilizers, pesticides, motor oil, and other hazardous chemicals; and strenuous litter-control programs.

■ **Implementation.** The responsible agencies would be local governments (Monroe County and the municipalities). Other primary agencies involved would be the FDEP, FDCA, and SFWMD. Educational aspects would be coordinated with the educational staffs of the Sanctuary (NOAA) and the SFWMD. In addition, the FDACS would be involved with respect to fertilizers and pesticides.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 36 months to complete.

### Marina and Live-Aboard Strategies

This section describes strategies/activities to reduce pollution from marinas and live-aboard boaters. Seven strategies have been developed to help reduce pollution from marinas and live-aboards. Five would attempt to reduce pollution by restricting discharges and educating the public (strategy B.7), concentrating live-aboards in areas where wastewater treatment facilities can be provided (strategy Z.5), and increasing the availability of pump-out facilities (strategies L.1 and L.6). Strategy L.2 would evaluate interagency cooperation for marina permitting. Strategy L.3 would reduce pollution from marina operations. The last strategy (E.4) would reduce

#### **Marina and Live-Aboard Strategies**

##### **B.7: Pollution Discharges**

- Implement the 1994 Florida Clean Vessel Act
- Evaluate the need for no-discharge zones
- Establish no-discharge zones
- Develop and implement a public education program
- Change environmental crimes category

##### **Z.5: Special-use Areas**

- Evaluate feasibility of mooring fields
- Establish criteria for mooring fields
- Establish mooring fields

##### **L.1: Marina Pumpout**

- Develop plan for sewage discharge elimination
- Require marina pump-out facilities
- Enforce pump-out use

##### **L.6: Mobile Pumpout**

- Establish mobile pump-out service

##### **L.2: Marina Siting and Design**

- Improve interagency cooperation in marina permitting

##### **L.3: Marina Operations**

- Establish containment areas for boat maintenance
- Encourage marina owners to participate in environmentally-oriented organizations
- Encourage marina owners to provide a user manual with local environmental information

##### **E.4: Training/Workshops/School Programs**

- Expand environmental awareness program

pollution from boaters and marinas in general, by expanding an existing education/environmental awareness program.

Additional data concerning pollutant concentrations in water and sediments of marinas and live-aboard areas will be collected through the Water Quality Monitoring Program described in strategy W.20. These data should indicate the severity and extent of water quality problems, and whether there is a need for further pollution-control measures.

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### Strategy B.7: Pollution Discharges

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Reduce pollution discharges (e.g., sanitary wastes, debris, and hydrocarbons) from vessels by implementing the 1994 Florida Clean Vessel Act and developing a public education program. Change the environmental crimes category associated with discharges from felony to civil offense, thereby removing the need to prove criminal intent.

*(Priority Level Medium, Medium Level of Action in Year 1, 48 Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Implement the 1994 Florida Clean Vessel Act.** The Florida Clean Vessel Act prohibits boaters from discharging raw sewage into state waters, effective October 1, 1994. In addition, all vessels 26 feet or more in length with an enclosed cabin and berthing facilities are required to have a toilet on board. Houseboats and floating structures must, by October 1, 1996 have permanently installed toilets attached to Type III marine sanitation devices, or directly connect their toilets to shoreside plumbing. Full implementation and enforcement of the Clean Vessel Act would reduce sewage pollution of Sanctuary waters.

■**Implementation.** The agency responsible for enforcing the Clean Vessel Act is the Florida Marine Patrol (FMP). NOAA will work with the EPA and the State to phase in the implementation of the Clean Vessel Act for Federal waters after full public review of the draft rules and public hearings, prior to issuance of final regulations. The Sanctuary regulations prohibit all marine sanitation discharges in the Ecological Reserves and Sanctuary Preservation Areas.

■**Schedule.** This activity will have a low level of action in year 1. This activity will require 12 months to complete.

**Activity 2-Evaluate the Need for No-discharge Zones.** A study would be conducted to evaluate the need for no-discharge zones in the Florida Keys, particularly in areas where live-aboard vessels congregate and there is a history of water quality violations. Aspects that should be considered include water circulation, concentration of boats in the area, percentage of boats with Type I or II marine sanitation devices, and impacts on fishing and swimming areas.

■**Implementation.** The EPA would be the responsible agency in evaluating the need for no-discharge zones. Other primary agencies involved would be the USCG, NOAA, and the FDEP. Monroe County will have an assisting role.

■**Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 3-Establish No-discharge Zones.** Based on the findings of the study described under Activity 2, the EPA would designate no-discharge zones in accordance with provisions of marine sanitation devices where live-aboard vessels congregate, and there is a history of water quality violations.

■**Implementation.** The EPA would be the responsible agency in designating the no-discharge zones. The legislative mechanism to implement this activity is in place. Enforcement procedures and responsibilities need to be worked out if the activity is to be effective. The FDEP and Monroe County will have an assisting role.

■**Schedule.** This activity will have no action in year 1. It will require 48 months to complete.

**Activity 4-Develop and Implement a Public Education Program.** This activity would create a program to educate the boating public about ways to reduce pollution from vessels. The program would include providing information about the Clean Vessel Act and other regulations affecting discharges from vessels.

■**Implementation.** The lead agency will be FMP, with assistance from the EPA and NOAA.

■**Schedule.** This activity will have a low level of action in year 1. This activity will require 12 months to complete.

**Activity 5-Change the Environmental Crimes Category.** This activity would change the environmental crimes category associated with discharges from a felony or misdemeanor to a civil offense, thereby removing the need to prove criminal intent. Currently, it is difficult to prove criminal intent for actions such as accidentally discharging fuel or pumping out a shipboard sewage holding tank. Therefore, in practice, law enforcement officers focus more attention on other crimes that require a less rigorous burden of proof. Making environmental crimes a civil, rather than criminal, offense would lead to an increased level of enforcement of environmental laws. Civil penalties could take the form of major fines for such accidents, without considering the intent of the individual involved.

■ **Implementation.** The responsible agency will be the FMP. Implementation would require changes in the Florida Statutes and Florida Administrative Code (FAC). NOAA and Monroe County may have an assisting role.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

***This strategy is also included in the Regulatory Action Plan.***

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### **Strategy Z.5: Special-use Areas**

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This strategy establishes zones to set aside areas for scientific research and educational purposes, restoration, monitoring, or to establish areas that confine or restrict activities such as personal watercraft operations and live-aboard mooring fields. These areas will minimize impacts on sensitive habitats and reduce user conflicts. Special management programs (e.g., monitoring, research, Special-use Permits, and restoration) can be conducted without impediment to these areas. They can be used to set aside areas for specific uses such as long-term research and monitoring and/or minimizing the adverse environmental effects of high-impact activities.

*(Priority Level Medium, Low Level of Action in Year 1, 12+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Evaluate Feasibility of Mooring Fields.** This activity would evaluate the feasibility of establishing mooring fields in places having significant concentrations of live-aboard vessels. The feasibility

study would evaluate whether mooring fields could be used in conjunction with shore-based or mobile pumpout facilities to provide an effective means of controlling waste discharges from live-aboard boats.

■ **Implementation.** The Sanctuary will be the lead agency. Local government (Monroe County and/or City of Key West) may have an assisting role, depending on the location of the mooring field(s).

■ **Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 2-Establish Criteria for Mooring Fields.** This activity would define criteria for designating mooring fields, based on the feasibility study conducted in Activity 1.

■ **Implementation.** The Sanctuary will be the lead agency. Local government (Monroe County and/or City of Key West) may have an assisting role, depending on the location of the mooring field(s).

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 3-Establish Mooring Fields.** Depending on the outcome of Activities 1 and 2, this activity would establish designated mooring fields or anchorage areas in places having significant concentrations of live-aboard vessels.

■ **Implementation.** The Sanctuary will be the responsible agency for designating mooring fields. The FDEP and USCG would assist in implementing this activity by providing sufficient technical expertise and jointly processing required permits. Legal designation of mooring fields requires a permit or land lease from the FDEP's Bureau of Submerged Lands and Preserves. It also requires a USCG permit because it affects navigable waters. The FDEP conducts environmental inspections of selected sites and issues resource evaluations and impact assessments. Local government (Monroe County and/or City of Key West) may have an assisting role, depending on the location of the mooring field(s).

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

***This strategy is also included in the Regulatory, Research and Monitoring, and Zoning action plans.***

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### Strategy L.1: Marina Pumpout

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Require marinas that have pump-out requirements to install pump-out facilities.

*(Priority Level High, Low Level of Action in Year 1, 60 Months to Complete, <50% Funding Available for Full Implementation)*

This strategy will eliminate marina live-aboard vessels as a source of pollution in the Sanctuary. Though live-aboards within marinas may be a minor contributor to the total pollutant load, marinas are normally located in confined waters that may be more susceptible to the impacts of such loading. By requiring marinas to provide pump-out facilities, two problems will be resolved: 1) boats in marinas that don't currently pump out will be provided with the means to do so; and 2) boats that moor outside of marinas can take advantage of the increased number of pump-out facilities.

**Activity 1-Develop a Plan for Sewage Discharge Elimination.** This activity would develop a comprehensive plan to deal with the problem of sewage discharges from live-aboards and other boaters. The plan could include elements such as requiring all marinas to install pump-out facilities (Activity 2); enforcing pump-out use (Activity 3); establishing a mobile pump-out service (strategy L.6); establishing mooring fields (Activity 3 under strategy Z.5, Special-use Areas), and evaluating the treatment and disposal of pumped out wastewater. However, before these activities are undertaken, a comprehensive study of the options is needed to devise a coordinated approach.

■**Implementation.** This activity could be implemented by local government (Monroe County and the municipalities). The FDEP and FDCA (through its authority set out in Chapter 380 FS — Critical Area Program) would also have a primary role. The EPA and NOAA would assist.

■**Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

#### **Activity 2-Require Marina Pump-out Facilities.**

This activity would require all marinas (10 or more slips, as defined by the State of Florida) to install pump-out facilities. This would greatly increase the number and accessibility of pump-out facilities in the Florida Keys. If pump-out facilities were more numerous and accessible, more people presumably would use them.

■**Implementation.** This activity could be implemented entirely by local government (Monroe County and the municipalities), which could pass ordinances requiring all marinas offering overnight docking to boats over a given length to have stationary or mobile equipment to pump the holding tanks of such vessels. The same option could be implemented at the State or even the Federal level, but implementation at these levels would be legislatively more complex, and would take substantially longer to put into practice. Monroe County will actively seek funding and coordinate with marinas to facilitate compliance.

■**Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 3-Enforce Pump-out Use.** This activity would enforce use of the expanded pump-out facilities developed under Activity 2 of this strategy, and the mobile pump-out service developed under Strategy L.6. A workable system of coordinated enforcement procedures has never been developed. Current pump-out usage is low, in part because existing pump-out facilities are few, and some are inaccessible to the public. One possible enforcement tool would involve issuing a large, visible sticker to all boats anchored in, or passing through, the Sanctuary. Each time a vessel's holding tanks were pumped out, the sticker would be stamped with the date and time. If the vessel had not had its holding tanks pumped out within a given length of time based on its size and carrying capacity, a citation would be issued.

■**Implementation.** Enforcement must be coordinated among the Sanctuary staff, FMP, and the Monroe County Sheriff's Department. In addition, "boating rights" representatives from the Keys need to be part of any discussions to implement enforcement measures. Coordination could be formalized through a series of MOUs or interlocal agreements.

■**Schedule.** This activity will have no action in year 1. It will require 60 months to complete.

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### Strategy L.6: Mobile Pumpout

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Establish a mobile pump-out service through the local government, or a franchise with a private contractor, which would serve to pump out live-aboard vessels moored outside of marina facilities. Encourage the use of existing, and the

construction of additional, shore-side facilities such as dinghy docks, parking areas, showers, and laundries for use by live-aboards.

*(Priority Level Medium, No Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Establish a Mobile Pump-Out Service.**

This activity would establish a mobile pump-out service either through local government or a franchise arrangement with a private contractor.

■ **Implementation.** Monroe County would be the responsible agency. No new legislation or legal authority is needed for the County to develop a mobile pump-out service. A prototype study could be conducted to determine how many live-aboard boaters in a given area would voluntarily subscribe to such a service. If the idea appeared to be economically viable, the County could advertise for suppliers of the service and sell franchises on a bid basis. The USCG would have an assisting role.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

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**Strategy L.2:  
Marina Siting and Design**

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Conduct an assessment of marina (10 slips or more) compliance with current regulations and standards, including OSHA standards for marina operations. Evaluate interagency cooperation in marina permit review process, and initiate action to eliminate conflicts in agency jurisdictions. Improve marina siting criteria to ensure that only appropriate deep water access will be permitted, and to provide for the proper handling of noxious materials.

*(Priority Level Low, No Action in Year 1, 36 Months to Complete, 100% Funding Available for Full Implementation)*

**Activity 1-Improve Interagency Cooperation in Marina Permitting.** Marina operations are already subjected to numerous permits and permit review processes. This activity would evaluate interagency cooperation to simplify matters for the marina operator, allow the implementation of Best Management Practices, and help reduce pollution reaching adjacent coastal waters. The possibility of consolidating permitting requirements into a single, overall FDEP operating permit would be included in this evaluation.

■ **Implementation.** The responsible agency will be the FDEP. The other primary agency involved will be the ACOE. The FDEP and ACOE should consider implementing a joint permitting process. Also, the FDEP needs to work with the EPA to make Florida a delegated state regarding NPDES stormwater discharge regulatory authority. This would avoid duplication in the permitting process.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

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**Strategy L.3:  
Marina Operations**

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Reduce pollution from marina operations by establishing containment areas for boat maintenance, encouraging marina owners to participate in environmentally-oriented organizations such as the International Marina Institute, and encouraging marina owners to provide a user manual with local environmental information such as locations of pumpout facilities and trash receptacles.

*(Priority Level Medium, No Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Establish Containment Areas for Boat Maintenance.** This activity would establish paved and curbed containment areas for boat maintenance activities such as hull scraping and repainting, mechanical repairs, fueling, and lubrication. It would create secondary containment, generally in the form of curbing or synthetic liners, for areas where significant quantities of hazardous or toxic materials are stored. Procedures to avoid or reduce fuel spillage during refueling operations would be evaluated.

■ **Implementation.** The responsible agency will be the EPA, working with the FDEP. Local governments (Monroe County and the municipalities) may have an assisting role. The NPDES stormwater discharge rule is the mechanism to implement this activity. In 1990, the EPA enacted rules to control stormwater discharges from a variety of uses. The rule is known as the NPDES Permit Application Regulations for Stormwater Discharges. Marinas that are involved in boat maintenance activities (including vessel rehabilitation, mechanical repairs, painting, fueling, and lubrication) or equipment-cleaning operations are considered industrial activities according to 40 CFR 122.26. Therefore, all marinas involved in such activities must apply for an NPDES stormwater

permit. These permits require applicants to address how they plan to eliminate pollutants such as toxics from the stormwater runoff generated as a result of their marina activities. The applicants have to identify the Best Management Practices they intend to use. One alternative is to construct containment areas and restrict all marine repair and boat hull reconstruction to these areas.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 2-Encourage Marina Owners to Participate in Environmentally-oriented Organizations such as the International Marina Institute.**

■ **Implementation.** The responsible agencies will be Monroe County and the municipalities working with the FDEP.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 3-Encourage Marina Owners to Provide a User Manual with Local Environmental Information.** The information could include locations of pumpout facilities and trash receptacles, as well as sensitive habitats.

■ **Implementation.** The responsible agencies will be Monroe County and the municipalities working with the FDEP.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

awareness program that has produced significant results in the past. If this program were expanded, additional reductions in pollution could be expected.

■ **Existing Program Implementation.** This activity would formalize and expand an existing activity - the FMP District 9 environmental education program. The program would be enhanced to heighten the environmental awareness of how human activities adversely affect water quality in the Keys.

■ **Implementation.** The FDEP would be the responsible agency in expanding the existing program operated by the FMP. All that is required to expand the program is additional funding, and a management directive from the FDEP to improve and increase the range of its existing program. All public awareness programs should be coordinated with the educational efforts of the Sanctuary.

■ **Schedule.** This activity will have a medium level of action in year 1. It will require 24 months to complete.

**This strategy is also included in the Education/Outreach and Volunteer action plans.**

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**Strategy E.4:  
Training/Workshops/School  
Programs**

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Develop opportunities for instruction and training. This will include programs conducted by teachers, Sanctuary staff, and volunteers. Training programs (e.g., Coral Reef Classroom, etc.) will also be provided for teachers, environmental professionals, business owners and operators, and law enforcement officials.

*(Priority Level Medium, Medium Level of Action in Year 1, 24 Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Expand the Environmental Awareness Program.** The FMP already has an environmental

## Landfill Strategies

This section describes strategies/activities to deal with potential pollution problems due to leaching from landfills. All landfill sites in the Florida Keys (with the exception of the Cudjoe Key expansion) were developed prior to current regulations requiring bottom liners and leachate collection. At many sites, filling with solid waste probably occurred below the water table in the early stages. Consistent with common practice at the time, there was probably little or no control over materials deposited in these landfills. These conditions indicate a significant potential for contamination of groundwater and surface waters from these inactive landfills.

Although the potential exists for problems, monitoring data do not indicate leaching or water quality degradation. Therefore, no corrective actions are proposed. However, two investigative activities are proposed under strategy L.7, SWD Problem Sites. These activities would involve searching for and assessing abandoned landfills and dumps (Activity 1), and intensifying existing monitoring programs around landfills (Activity 2) to ensure that no leaching into marine waters is occurring. Under Activity 3, remedial actions would be evaluated and implemented, but only if problems were discovered through Activities 1 or 2.

### Landfill Strategies

#### L.7: SWD Problem Sites

- Conduct historical landfill search and assessment
- Intensify landfill monitoring
- Evaluate and implement remedial actions

### Strategy L.7: SWD Problem Sites

Conduct an assessment to identify solid waste disposal sites that pose threats to water quality and/or sensitive areas, based on EPA's Water Quality Plan. Intensify existing monitoring programs around landfills to ensure that no leaching is occurring into marine waters. If problems are discovered, evaluate and implement appropriate remedial actions such as boring or mining, upgrading closure, collecting and

treating leachate, constructing slurry walls, and excavating and hauling landfill contents.

*(Priority Level Medium, No Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Conduct a Historical Landfill Search and Assessment.** Conduct a comprehensive search for abandoned landfills and dumps. Evaluate each site to determine if it contains hazardous materials or is causing environmental problems. According to knowledgeable state and local government personnel, there are a number of abandoned landfills and dumps, many on private property, within the Florida Keys. A comprehensive program needs to be set up to locate, map, and evaluate these historic casual dump sites to determine if they contain hazardous materials, or are causing environmental problems.

■ **Implementation.** The responsible agency will be Monroe County, working with the FDEP. The U.S. Navy would have a primary role in dealing with landfills on its property. The EPA would have an assisting role.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 2-Intensify Landfill Monitoring.** Intensify existing monitoring programs around landfills to ensure that no leaching is occurring into marine waters. Identify and monitor old landfills that were never permitted, and therefore have no closure plans or closure permits. This activity would help ensure that existing monitoring programs are adequate to detect leaching from landfills. Monitoring data from landfills in the Florida Keys do not indicate that there is a leaching problem. However, the number of monitoring locations is small, and should be increased to ensure that no leaching is occurring around these landfills. In addition, this strategy would provide for monitoring of older landfills that are not currently being monitored. It should be noted that Monroe County is currently complying with all State and Federal monitoring guidelines.

■ **Implementation.** The responsible agency will be identified. The U.S. Navy would have a primary role in dealing with landfills on its property. The EPA would have an assisting role.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 3-Evaluate and Implement Remedial Actions.** If problems are discovered, evaluate and



implement appropriate remedial actions such as boring or mining, upgrading closure, collecting and treating leachate, constructing slurry walls, and excavating and hauling landfill contents.

■ **Implementation.** The responsible agency will be Monroe County, working with the FDEP. The U.S. Navy would have a primary role in dealing with landfills on its property. The EPA would have an assisting role.

■ **Schedule.** This activity will have no action in year 1. It will require 60+ months to complete.

## Hazardous Materials Strategies

This section describes strategies/activities to reduce the likelihood of pollution from spills of hazardous materials in and near the Keys. The current management arrangement appears to be functioning adequately; however, there are some actions that could be taken to further reduce the potential for accidental spills. These management strategies would enhance HAZMAT response (W.15), improve spill reporting (W.16), and develop an inventory of hazardous materials handling and use in the Keys (L.10).

### Hazardous Materials Strategies

#### W.15: HAZMAT Response

- Develop and periodically revise Sanctuary spill contingency plan
- Improve coordination/cooperation
- Improve response/containment technologies

#### W.16: Spill Reporting

- Establish spill reporting system
- Establish and maintain Sanctuary spills database

#### L.10: HAZMAT Handling

- Conduct HAZMAT assessment/inventory

### Strategy W.15: HAZMAT Response

Improve and expand oil and hazardous materials response programs throughout the Sanctuary.  
(Priority Level Medium, Low Level of Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)

This strategy will reduce the chances that a spill of oil or other hazardous materials will have a significant negative impact on Sanctuary resources. This will be accomplished by improving coordination and cooperation among the Federal, State, and local agencies responding to spills; by encouraging improvements in response and containment technologies appropriate to the Keys; and by creating a spill contingency plan for the Sanctuary that includes crew and equipment staged in the Keys (possibly including skimmers). This strategy recognizes that spills of hazardous materials are handled independent of marine spills,

and improvement measures will be developed for both response programs.

**Activity 1-Develop and Periodically Revise Sanctuary Spill Contingency Plan.** This activity would involve creating and periodically revising spill contingency plan for the Sanctuary that includes crew and equipment staged in the Keys (possibly including skimmers). The plan should cover spills of a size not responded to by the USCG and should include training and education of a local response team. Marine HAZMAT response will be coordinated from the Marine Safety Office in Miami. Because spills of hazardous materials are handled independent of marine spills, improvement measures will be developed for both response programs.

■ **Implementation.** The responsible agencies will be the USCG and FDEP. NOAA, Monroe County, and FDCA will assist.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 2-Improve Coordination and Cooperation.** This activity will involve improving coordination and cooperation among the Federal, State, and local agencies responding to spills.

■ **Implementation.** The responsible agencies will be the USCG and FDEP. NOAA, Monroe County, and the FDCA will assist.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 3-Improve Response/Containment Technologies.** This activity would encourage improvements in response and containment technologies appropriate to the Keys.

■ **Implementation.** The responsible agencies will be the USCG and FDEP. NOAA, Monroe County, and FDCA will assist.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

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## **Strategy W.16: Spill Reporting**

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Establish a reporting system to ensure that all spills in and near the Sanctuary are reported to Sanctuary managers and managers of impacted areas within the Sanctuary. Establish a geo-referenced Sanctuary spills database.

*(Priority Level Low, Low Level of Action in Year 1, 24 Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1 - Establish Spill Reporting System.** This activity would establish a reporting system to ensure that all spills documented by various agencies (e.g., USCG, NOAA, FDEP) are reported to Sanctuary managers. Small spills in particular are under-reported; they occur frequently, and therefore may have a significant cumulative effect on water quality in the Sanctuary.

■ **Implementation.** The responsible agency will be the USCG. Other primary agencies involved are NOAA and the FDEP. The FDEP would assist in reporting land-based spills that might affect Sanctuary waters. The existing protocol for spill notification should be used. The National Response Center is to be notified of all spills.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 2-Establish and Maintain Sanctuary Spills Database.** This activity would establish and maintain a geo-referenced database for the Sanctuary that could be used to keep track of information about spills (e.g., locations, quantities, types of material spilled, environmental impacts).

■ **Implementation.** The responsible agency will be NOAA, with assistance from the FDEP and the USCG.

■ **Schedule.** This activity will have no action in year 1. It will require 24 months to complete.

### Strategy L.10: HAZMAT Handling

Conduct an assessment and inventory of hazardous materials handling and use in the Florida Keys including facilities, types and quantities of materials, and transport/movement. Add information to the FDEP/EPA/Monroe County geographic information system (GIS) database.

*(Priority Level Medium, No Action in Year 1, 36 Months to Complete)*

**Activity 1-Conduct a HAZMAT Assessment/Inventory.** This activity would involve conducting an assessment and inventory of hazardous materials handling and use in the Florida Keys including facilities, types and quantities of materials, and transport/movement. Information will be added to the FDEP/EPA/Monroe County GIS database.

■ **Implementation.** The responsible agency will be the FDEP. Other primary agencies involved will be the EPA, FDEP, and Monroe County (e.g., Monroe County Health Department maintains database on hazardous materials). The FDCA will have an assisting role.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

### Mosquito Spraying Strategies

This section describes strategies/activities to reduce pollution from pesticides used in mosquito spraying. There are no data indicating that the Mosquito Control Program is causing water quality problems in the Sanctuary. However, there is little existing information on environmental concentrations and/or effects of pesticides in the Sanctuary. Additional data concerning pesticide concentrations in sediments and biological tissue throughout the Sanctuary will be collected through the Water Quality Monitoring Program (strategy W.20).

Based on the considerations discussed above, strategies for major changes to the Mosquito Control Program are not appropriate at this time. Additional data from the Water Quality Monitoring Program (strategy W.20) will help to determine whether major changes are warranted. Two strategies are discussed below. The first (W.17) will involve making refinements to the existing program. The second (W.18) will involve conducting research on the impacts of pesticide use in the Keys, and alternative practices. Under strategy W.18, the mosquito control program could be modified depending on the research findings. Strategy W.18 also includes a field survey of the full suite of pesticides, herbicides, fungicides, etc. used in the Sanctuary.

### Mosquito Spraying Strategies

#### W.17: Mosquito Spraying

- Review aerial spraying threshold
- Review flight plans and equipment
- Reconsider larvicide use
- Evaluate ultra-low-volume methods

#### W.18: Pesticide Research

- Research impacts and alternatives
- Modify mosquito control program
- Conduct field survey of pesticide and herbicide use

### Strategy W.17: Mosquito Spraying

Refine the aerial mosquito spraying program to further reduce aerial spraying over marine areas.  
*(Priority Level High, High Level of Action in Year 1, 12 Months to Complete, 75-99% Funding Available for Full Implementation)*

This strategy would seek to reduce the amounts of pesticides entering Sanctuary waters through refinement of the existing aerial spraying program. Ground spraying by truck is the current method of choice for controlling the adult mosquito population. However, aerial spraying is initiated when the mosquito population reaches a certain threshold as determined by mosquito landing counts at test sites. Although the Monroe County Mosquito Control District attempts to avoid marine areas during aerial spraying, the potential for pesticides to reach marine waters might be reduced through refinements in the program.

**Activity 1-Review the Aerial Spraying Threshold.**

The threshold for initiating aerial spraying will be reviewed to determine whether it can be raised.

■ **Implementation.** The responsible agency will be the Florida Department of Agriculture and Consumer Services (FDACS). Also, FDCA will have an assisting role.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 12 months to complete.

**Activity 2-Review Flight Plans and Equipment.**

The aerial spraying program would be reviewed to determine whether the amount of spray released over water could be reduced through development of a more refined plan for flight lines, and the use of improved equipment.

■ **Implementation.** The responsible agency will be the FDACS. Also, the FDCA will have an assisting role.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 12 months to complete.

**Activity 3-Reconsider Larvicide Use.** Ground spraying of larvicides in currently restricted areas will be reviewed as a means to reduce the need for aerial spraying of adult mosquito populations.

■ **Implementation.** The FDACS should be the responsible agency to organize a meeting to discuss this issue. The FDCA will have an assisting role in this activity.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 12 months to complete.

**Activity 4-Evaluate Ultra-Low-Volume Methods.**

This activity will involve evaluating the possibility of eliminating thermal fogs, which contain diesel oil. Ultra-low-volume (ULV) spraying techniques have been developed which do not use thermal fogs and

therefore would eliminate this source of diesel oil in the environment. The use of these techniques would likely require some additional training of pilots.

■ **Implementation.** The responsible agency will be the FDACS. Also, the FDCA will have an assisting role.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 12 months to complete.

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**Strategy W.18:  
Pesticide Research**

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Develop and implement an independent research program to assess and investigate the impacts of, and alternatives to, current pesticide practices. Modify the Mosquito Control Program as necessary on the basis of research findings. Conduct a field survey of pesticide and herbicide use in the Keys. *(Priority Level High, No Action in Year 1, 36+ Months to Complete, <50% Funding Available for Full Implementation)*

This strategy will establish an independent research program to identify the impacts that current spraying practices have on Sanctuary resources, and will identify alternative means of mosquito control. Because pesticides used in mosquito control are nonspecific to the larval stages of crustaceans, fish, and natural mosquito control predators, the effects of the chemicals used, and all of the application methods employed, need to be examined. In addition, the impact of housing patterns, design, and landscaping as they affect the demand for mosquito control needs to be investigated. The results of this research may be used to modify the Mosquito Control Program.

**Activity 1-Research Impacts and Alternatives.** A research program will be established to identify the impacts of current spraying practices on Sanctuary resources, and to identify alternative means of mosquito control.

■ **Implementation.** The responsible agency will be the FDACS. The FDEP will also have a primary role regarding evaluations of pesticide toxicity. The FDCA may also have an assisting role. As the State land-planning agency for a designated Area of Critical State Concern, the FDCA has an oversight responsibility to ensure that local development regulations adequately protect the area's natural resources. FDACS will be responsible for ensuring that mosquito

control activities are addressed according to Chapter 388, F.S.

■ **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 2-Modify the Mosquito Control Program.** The results of the pesticide research program will be used to modify the existing Mosquito Control Program as necessary.

■ **Implementation.** The responsible agency will be the FDACS. The FDEP will also be involved as a primary agency.

■ **Schedule.** This activity will have no action in year 1. It will require 36+ months to complete.

**Activity 3-Conduct Field Survey of Pesticide and Herbicide Use.** This activity would involve a field survey of the full suite of pesticides, herbicides, fungicides, etc. used in the Keys.

■ **Implementation.** The responsible agency will be the FDACS. The FDEP will also be involved as a primary agency.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**This strategy is also included in the Research and Monitoring Action Plan.**

### Canal Strategies

This section describes strategies/activities to reduce water quality problems in canals. Although some of these problems are clearly linked to wastewater discharges (from septic tanks of homes lining the canals), others may be due to the physical structure and orientation of the canals. These factors can lead to low flushing and buildup of weed wrack, which consumes oxygen and releases nutrients as it decays. The strategy described here would inventory and characterize canals and investigate technologies to determine whether it would be worthwhile to implement corrective actions such as weed gates and bubblers, to improve water quality. Any plan for implementing such improvements would have to be developed in coordination with plans for dealing with wastewater pollution from septic tanks, which contributes to water quality problems in many canal systems.

### Strategy W.10: Canal WQ

Evaluate and revise list of known hot spot canal systems. Inventory and characterize dead-end canals/basins and investigate alternative management strategies to improve their water quality. Revise FDEP permit criteria to allow alternative strategies to improve canal water quality. Identify and compile a list of technologies for canal restoration. Develop a community education and involvement program, and conduct a canal system restoration pilot project. Implement improvements (consistent with the strategies developed for wastewater and stormwater) in known hot spots throughout the Sanctuary. (Priority Level High, Low Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)

#### Canal Strategies

##### W.10: Canal WQ

- Evaluate and revise Hot Spot list
- Inventory and characterize canals
- Develop and evaluate improvement strategies
- Revise FDEP permit criteria
- Identify and compile technologies
- Develop community education and involvement program
- Conduct canal system restoration pilot program
- Implement improvement strategies

**Activity 1-Evaluate and Revise Hot Spot List.** The SFWMD will conduct a hot spot workshop in early 1996 to evaluate and revise the existing list of hot spots.

■ **Implementation.** The responsible agency will be SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 2-Inventory and Characterize Canals.** An inventory of dead-end canals and other confined water bodies will be conducted to identify areas where reduced circulation increases the risk of

depressed dissolved oxygen, retention of both dissolved and particulate pollutants and potential impacts on benthic and pelagic environments. Canals with water quality problems attributable mainly to their physical structure and orientation (e.g., allowing weed wrack buildup) rather than wastewater or stormwater pollutants would be targeted for improvements.

■ **Implementation.** The responsible agency will be the SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 3-Develop and Evaluate Improvement Strategies.** A comprehensive management plan will be developed for improving water quality in nearshore confined basins and canals. Potential methods of improving water quality (e.g., aeration, weed gates, and air curtains) will be tested in limited areas to determine whether widespread application is appropriate.

■ **Implementation.** The responsible agency will be the SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have no action in year 1. It will require 24 months to complete.

**Activity 4-Revise FDEP Permit Criteria.** This activity would revise FDEP permit criteria to allow selected canal water quality improvement strategies.

■ **Implementation.** The responsible agency will be SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 5-Identify and Compile Technologies.** This activity would identify and compile a list of technologies for improving water quality in canals.

■ **Implementation.** The responsible agency will be SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 6-Develop Community Education and Involvement Program.** This activity would involve developing a community education program, including citizens monitoring.

■ **Implementation.** The responsible agency will be SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 7-Conduct Canal System Restoration Pilot Project.**

■ **Implementation.** The responsible agency will be SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have no action in year 1. It will require 12 months to complete.

**Activity 8-Implement Improvement Strategies.** Effective improvement strategies identified through previous activities will be implemented in all canals and basins identified as hot spots.

■ **Implementation.** The responsible agency will be the SFWMD. Other agencies with primary roles will be the EPA, FDEP, Monroe County, and the City of Key West.

■ **Schedule.** This activity will have no action in year 1. It will require 60 months to complete.

## Monitoring and Research/Special Studies Strategies

This section includes monitoring and research/special studies strategies designed to provide information for management decisions. Previously described strategies which require information from research/monitoring efforts are W 3 (Wastewater Management Systems), W 5 (Water Quality Standards), W 11 (Stormwater Retrofitting), and W 19 (Florida Bay Freshwater Flow)

Goals of the comprehensive monitoring program (strategy W 20) are the following

- provide long-term, comprehensive information about the status and trends of water quality parameters and biological resources in the Sanctuary, and
- evaluate the effectiveness of remedial actions taken to reduce water pollution

Goals of the Research/Special Studies Program (strategies W 21 to W 24) are to identify and understand cause/effect relationships involving pollutants,

transport pathways, and the biological communities of the Sanctuary. The Research/Special Studies program is designed to do the following

- Identify and document cause/effect linkages between specific pollutants, water quality problems, and ecological impacts,
- Improve understanding of Sanctuary ecosystems and develop predictive capabilities based on that understanding, and
- Develop innovative monitoring and research tools to detect pollutants, provide early warning of widespread ecological problems, and identify cause/effect relationships

Other strategies in this section are applicable to both research/special studies and monitoring. These are W 28 (Regional Database), W 29 (Dissemination of Research Findings), and W 32 (Technical Advisory Committee). Strategy W 32 must be implemented first to provide technical oversight for the program. Strategy W 28 should also be implemented before specific special studies and monitoring efforts are undertaken.

### Monitoring and Special Studies Strategies

#### W.20: Monitoring

- Develop monitoring implementation plan
- Select organization/institution to conduct monitoring
- Establish QA/QC authority and protocols
- Implement monitoring

#### W.21: Special Studies: Predictive Models

- Conduct a modeling workshop
- Develop a modeling implementation plan

#### W.22: Special Studies: Wastewater Pollutants

- Detect wastewater pollutants and ecological impacts

#### W.23: Special Studies: Other Pollutants and Water Quality Problems

- Estimate other pollutant loadings
- Identify causal linkages between pollutants and ecological impacts
- Develop and evaluate innovative monitoring tools
- Conduct research on global change

#### W.28: Regional Database

- Conduct user needs assessment
- Develop implementation plan
- Implement and maintain data management system

#### W.29: Dissemination of Findings

- Establish information exchange network
- Sponsor conferences
- Support journal publication
- Disseminate findings to the public

#### W.32: Technical Advisory Committee

- Establish technical advisory committee

#### W.33: Ecological Monitoring Program

(Refer to the Research and Monitoring Action Plan)

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## Strategy W.20: Monitoring

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Conduct a long-term, comprehensive monitoring program as described in the EPA Water Quality Protection Program.

*(Priority Level High, High Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

This strategy will provide long-term, comprehensive information about the status and trends of water quality parameters and biological resources in the Sanctuary. It will allow managers to identify or confirm problem areas and determine whether conditions are improving or degrading. In addition, remedial actions taken to reduce pollution will be monitored to evaluate their effectiveness. Water column parameters to be monitored include temperature, salinity, dissolved oxygen, pH, photosynthetically active radiation, turbidity, nutrients, chlorophyll-*a*, and alkaline phosphatase activity. Sediment parameters to be monitored include grain size, mineralogy, organic content, nutrients, metals, pesticides, PCBs, petroleum hydrocarbons, and sewage tracers. In addition to water and sediment sampling, biological monitoring of seagrass, hardbottom, and mangrove communities will be conducted. Seagrass communities and hardbottom communities (including offshore coral reefs and nearshore hardbottom areas) will be monitored by *in situ* sampling and remote sensing. Changes in the areal coverage of mangrove communities will be monitored by remote sensing.

Design of the comprehensive monitoring program is described in the EPA Water Quality Protection Program Phase II Report, Task 6. An Implementation Plan was subsequently developed which: 1) revised the Program based on available funding; and 2)-developed specific details of program design (e.g., locations of water quality, coral reef, and seagrass sampling locations).

- **Existing Program Implementation.** All of the preliminary activities described here have been completed, and monitoring is in progress.
- **General Implementation.** The responsible agencies for water quality monitoring will be the EPA and FDEP. In addition, the FDEP will be responsible for establishing and maintaining the scientific database generated through the Monitoring Program (see strategy W.28).

Specific institutions, organizations, and/or individuals may be selected to conduct various aspects of the Program. These will be selected by the EPA and FDEP working with the Technical Advisory Committee (see strategy W.32).

- **General Cost.** The Monitoring Program is expected to cost about \$5 million over the fiscal year 1994-98 planning period. This cost is for actual execution of the Program, and is not reflected in the costs of preliminary activities described below.

**Activity 1-Develop a Monitoring Implementation Plan.** This activity will develop an implementation plan that will: 1) revise the design of the Monitoring Program based on anticipated funding; and 2) describe specific steps to be taken in implementing the Program. Revision of the Program will probably involve some combination of reducing the scope of individual components (e.g., number of stations, transects, etc.) and prioritizing components to be funded first.

■ **Schedule.** This activity has been completed.

**Activity 2-Select Organizations/Institutions to Conduct Monitoring.** This activity will involve selecting an organization or institution to conduct the monitoring program under the direction of the EPA, FDEP, and the Technical Advisory Committee.

■ **Schedule.** This activity has been completed.

**Activity 3-Establish Quality Assurance/Quality Control Authority and Protocols.** This activity will involve designating a quality assurance/quality control (QA/QC) officer, developing QA/QC protocols for the Monitoring Program, and developing guidelines for researchers to prepare their own QA/QC plans for research projects.

■ **Schedule.** This activity has been completed.

**Activity 4-Implement Monitoring.** This activity will involve conducting water quality, coral reef, and seagrass monitoring as described in the Implementation Plan developed in Activity 1.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 60+ months to complete.

**This strategy is also included in the Research and Monitoring and Volunteer action plans.**



### Strategy W.21: Predictive Models

Develop phased hydrodynamic/water quality models and coupled, landscape-level ecological models to predict and evaluate the outcome of in-place and proposed water quality management strategies. (Priority Level High, Low Level of Action in Year 1, 12+ Months to Complete, <50% Funding Available for Full Implementation)

This strategy will develop predictive models which, used with appropriate scientific guidance, would allow resource managers to predict and evaluate the outcome of various management strategies (e.g., engineering actions to reduce wastewater nutrient loadings). Initial conceptual models would be developed, information needs identified, environmental data gathered, and quantitative models developed and refined over the long-term and on a continuous basis, to aid in management decisions.

- **General Schedule.** This is a long-term strategy that is expected to be ongoing through 1998.
- **Existing Program Implementation.** The University of Miami's Center for Marine and Environmental Analysis is undertaking a major, 6-year, multimillion dollar effort to model various aspects of the South Florida environment.

**Activity 1-Conduct a Modeling Workshop.** This activity will involve conducting a workshop to discuss modeling approaches, develop preliminary conceptual models, and define specific information needs for the models.

■ **Implementation.** The responsible agencies will be the EPA and FDEP.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 12 months to complete.

**Activity 2-Develop a Modeling Implementation Plan.** This activity will involve developing an overall plan for developing predictive models focused on management needs. The plan will include discussion of preliminary conceptual models, data needs, data gathering, and model development and refinement. The plan will also discuss mechanisms for ensuring that the modeling effort remains closely tied to management needs.

■ **Implementation.** The responsible agencies will be the EPA and FDEP. The NPS and SFWMD will have an assisting role because they are involved in model development for the Everglades and Florida Bay.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 12+ months to complete.

**This strategy is also included in the Research and Monitoring Action Plan.**

### Strategy W.22: Wastewater Pollutants

Conduct special studies to document the fate and ecological impacts of wastewater pollutants. (Priority Level High, Low Level of Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)

**Activity 1-Detect Wastewater Pollutants and Ecological Impacts.** This activity involves conducting special studies to: 1) establish pollutant loading thresholds above which biotic communities are adversely affected; 2) detect the presence of wastewater pollutants from OSDS, cesspits, package plant boreholes, and/or surface water dischargers and to determine the relative contributions of each to Sanctuary surface waters, groundwaters, and/or sediments; 3) document the transport of pollutants and describe the severity and extent of ecological impacts that can be specifically linked to these pollutants. The scope includes all sources of wastewater pollutants throughout the Sanctuary. Potential approaches include experimental studies (laboratory, mesocosm, *in situ* or combinations); eutrophication gradient studies; comparative studies of impacted and non-impacted sites; historical studies (sclerochronology, geological reconstruction); geographic comparisons (Keys vs. other areas); use of biochemical and ecological indicators such as tissue C:N:P ratios, alkaline phosphate activity, and shifts in community structure; use of sewage tracers; and high-frequency and/or spatially intensive water quality sampling.

■ **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. NOAA may also have a primary role, and Monroe County may assist.

- **Schedule.** This activity will have a low level of action in year 1. It will require 36 months to complete.

***This strategy is also included in the Research and Monitoring Action Plan.***

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### Strategy W.23: Special Studies

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Conduct special studies to document the fate and ecological impacts of non-wastewater pollutants, develop innovative monitoring tools, and examine the effects of global climate change on the organisms and ecosystems of the Keys.

*(Priority Level Medium, No Action in Year 1, 36 Months to Complete, <50% Funding Available for Full Implementation)*

**Activity 1-Estimate Other Pollutant Loadings.** This activity will involve documenting the locations and magnitudes of pollution inputs (other than wastewater) to the Sanctuary to better understand what areas are at risk. Sources will include those that are point, nonpoint, and external to the Sanctuary (e.g., permitted discharges, OSDs, stormwater runoff, groundwater leachates, marinas, C-111, Biscayne Bay, Florida Bay, southwest Florida and oceanic fluxes and gyre-induced upwelling). Pollutants will include hydrocarbons, heavy metals, and pesticides. Load estimates will be based on the best available information, and will include engineering estimates where applicable.

- **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. Assistance may be provided by NOAA, the NPS, and the SFWMD.

- **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 2-Identify Causal Linkages Between Pollutants and Ecological Impacts.** This activity will involve conducting research to identify and document causal linkages between non-wastewater pollutants and specific ecological problems.

- **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. Assistance may be provided by NOAA, the NPS, and the SFWMD.

- **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 3-Develop and Evaluate Innovative Monitoring Tools.** This activity would identify and evaluate innovative monitoring tools and methodologies to detect pollutants and identify cause/effect relationships involving water quality and biological resources. New or modified monitoring tools and methodologies may be needed because of the unique biota and environmental conditions of the Sanctuary.

- **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. NOAA will also have a primary role.

- **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

**Activity 4-Conduct Research on Global Change.** This activity will involve research to examine the effects of stresses associated with global change on the ecosystem. Examples of stresses include temperature, salinity, frequency and intensity of storms, turbidity, sea level change, ultraviolet and visible radiation.

- **Implementation.** NOAA will be the responsible agency. The EPA, FWS, and FDEP will provide assistance.

- **Schedule.** This activity will have no action in year 1. It will require 36 months to complete.

***This strategy is also included in the Research and Monitoring Action Plan.***

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### Strategy W.28: Regional Database

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Establish a regional database and data management system for recording research results and biological, physical, and chemical parameters associated with Sanctuary monitoring programs.

*(Priority Level High, High Level of Action in Year 1, 12 Months to Complete, 100% Funding Available for Full Implementation)*

**Activity 1-Conduct User Needs Assessment.** This activity will involve contacting agencies, institutions, and individuals likely to be involved in water quality

monitoring and/or research efforts, to determine their needs in terms of data products.

■ **Existing Program Implementation.** This activity has been completed.

■ **Implementation.** The FDEP will be the responsible agency. The EPA and NOAA will have a primary role in a committee that will oversee data management efforts.

■ **Schedule.** This activity has been completed.

**Activity 2-Develop Implementation Plan.** This activity will involve developing an implementation plan that addresses all aspects of data management for research and monitoring efforts, including information distribution, storage, archiving, and QA/QC of data input. The regional database will include biological, physical, and chemical parameters and instrument records, etc. The implementation plan will discuss existing databases and address issues including public access, volunteer data entry, GIS integration and compatibility, and integration of new and historical findings.

■ **Existing Program Implementation.** This activity has been completed.

■ **Implementation.** The FDEP will be the responsible agency. The EPA and NOAA will also have a primary role in a committee that will oversee data management efforts.

■ **Schedule.** This activity has been completed.

#### **Activity 3-Implement and Maintain Data Management System.**

■ **Implementation.** The FDEP will be the responsible agency. The EPA and NOAA will also have a primary role in a committee that will oversee data management efforts.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 60+ months to complete.

**This strategy is also included in the Research and Monitoring Action Plan.**

### **Strategy W.29: Dissemination of Findings**

Develop a program to synthesize and disseminate scientific research and monitoring results including an information exchange network, conferences, and support for the publication of research findings in peer-reviewed scientific journals.

*(Priority Level Medium, Low Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

This strategy would help to disseminate information about research findings among scientists and resource managers and to the general public.

**Activity 1-Establish an Information Exchange Network.** This activity will develop a compendium of ongoing and planned research in the Sanctuary that will be updated periodically.

■ **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. NOAA will have a primary role.

■ **Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 2-Sponsor Conferences.** This activity will involve sponsoring conferences to keep both scientists and managers abreast of research/monitoring results and existing/planned management actions.

■ **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. NOAA will have a primary role.

■ **Schedule.** This activity will have no action in year 1. It will require 60+ months to complete.

**Activity 3-Support Journal Publication.** This activity will involve funding the publication of research and monitoring findings in peer-reviewed scientific and management journals.

■ **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. NOAA will have a primary role.

■ **Schedule.** This activity will have no action in year 1. It will require 60+ months to complete.

**Activity 4-Disseminate Findings to the Public.**

This activity would use existing mechanisms and continue to develop mechanisms to synthesize and disseminate findings of the research and monitoring programs to the public.

■ **Implementation.** The EPA, FDEP, and NOAA will be the responsible agencies for this strategy. NOAA's annual report will contain a synthesis of scientific findings written for the average citizen and will be distributed widely.

■ **Schedule.** This activity will have no action in year 1. It will require 60+ months to complete.

***This strategy is also included in the Research and Monitoring Action Plan.***

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**Strategy W.32:  
Technical Advisory Committee**

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Establish a technical advisory committee for coordinating and guiding research and monitoring activities by both the EPA and NOAA.

*(Completed in Year 1)*

**Activity 1-Establish a Technical Advisory Committee.** This activity will create a technical advisory committee as required by the National Marine Sanctuaries Program Amendments Act of 1992. The Technical Advisory Committee "shall be composed of scientists from Federal agencies, State agencies, academic institutions, private nonprofit organizations, and knowledgeable citizens." It will guide the process of setting priorities for research and monitoring for both the EPA and NOAA.

■ **Existing Program Implementation.** This activity was completed during fiscal year 1993, prior to the starting date used in this action plan.

■ **Implementation.** The EPA and FDEP will be the responsible agencies for this strategy. NOAA will have a primary role.

***This strategy is also included in the Research and Monitoring Action Plan.***

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**Strategy W.33:  
Ecological Monitoring Program**

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Develop and implement a Sanctuary-wide, intensive ecosystem monitoring program. The objective of the program will be to monitor the status of various biological and ecological indicators of system components throughout the Sanctuary and adjacent areas, in order to discern the local and system-wide effects of human and natural disturbances, and assess the overall health of the Sanctuary.

This strategy will establish a comprehensive, long-term monitoring program throughout the Sanctuary and adjacent areas that will have three purposes: to supply resource managers with information on the status of the health of living resources and the ecosystem; to determine causal relationships related to management decisions; and to evaluate the effectiveness of management actions such as zoning implementation.

The Ecological Monitoring Program will be fully integrated with the comprehensive monitoring program (water quality, coral reefs, seagrass), and will include a temporal and spatial ecological information system based on current knowledge; a Technical Advisory Committee to assist NOAA with the design and prioritization of the Research and Monitoring Program; status and trends assessments of corals, fishes, seagrasses, benthic organisms and algae, plankton, and mangroves; a fisheries ecology monitoring and research component to examine community composition and function within the Sanctuary's habitats; a sampling protocol; a data analysis, management, and dissemination protocol; a quality assurance/quality control protocol; the development of an index of Sanctuary health; and a volunteer monitoring program.

*(Priority Level High, Medium Level of Action in Year 1, 60+ Months to Complete, <50% Funding Available for Full Implementation)*

■ **General Implementation.** NOAA will be responsible for the overall implementation of the Ecological Monitoring Program, working with EPA, FDEP, academic and nongovernmental organizations, and the Technical Advisory Committee. NOAA will have lead responsibility for implementing most activities, but the FDEP will be responsible for establishing an ecological information system (Activity 1) and data analysis, management, and dissemination protocol (Activity 6). The Technical Advisory Committee will

assist NOAA in establishing a sampling protocol (Activity 5).

■ **General Relationship to Other Strategies.** Integration of the Ecological Monitoring program and the Water Quality Protection Program will be achieved through the Technical Advisory Committee (TAC) and Management Committee specified in the Water Quality Protection Program. The TAC will be used by NOAA to assist in the design and prioritization of the Research and Monitoring Program. The Sanctuary Superintendent will serve on the Management Committee which coordinates and facilitates the efforts of the TAC.

■ **General Schedule.** The Ecological Monitoring Program will have a medium level of action in year 1. It will require 60+ months to complete.

***This strategy is also included in the Research and Monitoring and Volunteer Action Plans. Refer to the Research and Monitoring Action Plan for a description of activities.***

## Implementation

**This section explains how the Water Quality Action Plan will be implemented. The institutions responsible for each activity, and those agencies that will provide some level of assistance, are identified. In addition, the number of months required to complete, cost estimates, staff and equipment requirements, and the geographic focus of each activity are provided. The section concludes with a description of contingency planning for changing budgets, and the process used to evaluate the effectiveness of the Water Quality Action Plan as it evolves over time.**

**Responsible Institutions.** The Water Quality Action Plan will be implemented by a coordinated framework of Federal, State, and local agencies. The EPA and FDEP, however, will have the lead responsibility in the overall implementation of the Plan. They will coordinate closely with NOAA, which has overall responsibility for implementing the Management Plan for the Sanctuary. Other agencies with lead responsibility for one or more activities are the USCG, FDHRS, FDCA, FDACS, FKAAs (possibly), Monroe County, and the municipalities. In addition, the SFWMD has a primary or assisting role in several strategies. Table 25 lists the responsible institutions and their level of responsibility in each activity.

**Priority Activities.** Each activity included in the Water Quality Action Plan is ranked as high, medium, or low priority (Table 26). High-priority strategies (summarized in Table 27) are those that have the greatest urgency and are most likely to be implemented first. A strategy's priority is also based upon its projected effectiveness in reducing water quality problems in the Sanctuary. Strategies that would reduce pollution directly, provide information needed for critical decisions, or allow another high-priority strategy to be implemented are generally assigned a high priority. Strategies that might indirectly reduce pollution by making the management/regulatory system work more efficiently are generally assigned a low priority. However, some low-priority strategies might be implemented early if they are simple and inexpensive.

**Schedule.** Table 26 lists the estimated time required for the implementation of each strategy and activity included within the program. The number of months required to complete each strategy and activity is provided. For this action plan, year 1 is defined as beginning in fiscal year 1994, not in fall 1994 as in other action plans.

**Cost.** Table 26 also lists estimated costs to implement each strategy and its component activities. Costs are divided into capital cost, and annual operating and maintenance costs.

Most of the costs listed in the table are institutional costs for implementing the strategies, as developed at the "Institutional Arrangements and Approximate Costs Work Session" held in the Florida Keys on October 21-22, 1992. However, estimates for five strategies also include costs for upgrading, constructing, and/or maintaining facilities:

- W.1 (OSDS Demonstration Project);
- W.2 (AWT Demonstration Project);
- W.3 (Wastewater Management Systems);
- W.4 (Wastewater Disposal, City of Key West); and
- W.11 (Stormwater Retrofitting).

These costs are from the Phase II report of the EPA Water Quality Protection Program. Potential funding sources are also discussed in that report. Much more detailed information on costs and implementation requirements would have to be developed before these improvements were undertaken.

Based on the figures in Table 26, the estimated cost to implement all activities in the Water Quality Action Plan is between \$290 million to \$510 million. However, much of this total is accounted for by the following two very expensive strategies.

- W.3 (Wastewater Treatment Outside Key West): At a minimum, >\$57 million to eliminate cesspits and upgrade OSDS (septic systems) to current standards. Plus, if chosen as the preferred wastewater treatment option, >\$200 million to construct two community sewage plants serving Key Largo and Marathon.
- W.11 (Stormwater Retrofitting): \$200 million to implement stormwater engineering modifications to hot spots and portions of US 1.

Because of the high costs involved, substantial data collection through prerequisite strategies will be necessary to enable decisions regarding implementation of either strategy.

The following are additional strategies costing \$5 million or more:

- L.7 (SWD Problem Sites): >\$10 million to implement remedial actions at landfill sites, if necessary. [Note: the most costly activity (remediation) is a low priority, because it would be implemented only if significant problems were detected through a landfill search and intensified monitoring.]
- W.4 (Wastewater Disposal, City of Key West): >\$7 million to upgrade effluent disposal (using deep-well injection for a minimum estimate).
- W.33 (Ecological Monitoring Program): \$5 million to \$7 million to monitor the status and trends of various ecological indicators of ecosystem health.
- W.14 (Best Management Practices): >\$5 million to implement best management practices for stormwater runoff.
- W.20 (Monitoring Program): About \$7 million to monitor status and trends in water quality and biological resources.

Excluding the two very expensive strategies discussed above (W.3 and W.11), the total cost of all strategies is \$34 million to \$55 million. (This is based on the strategy costs listed in Table 26).

**Geographic Focus.** The geographic focus (Sanctuary-wide, Upper Keys, Middle Keys, or Lower Keys) for each activity is indicated in Table 26. Most of the activities are Sanctuary-wide in focus. The two demonstration projects (strategies W.1 and W.2) will be conducted in specific areas of the Upper or Middle Keys, but are intended to provide broadly applicable information. Strategy W.4 applies only to Key West.

**Personnel.** The staff required to implement the Water Quality Action Plan will be a combination of personnel from various agencies and organizations identified in Table 25. In addition, scientists from various universities, research institutions, and environmental firms may be involved in the Water Quality Monitoring Program (strategy W.20) and various research strategies (strategies W.21 to W.24). Volunteers may be involved in conducting portions of the Water Quality Monitoring Program, but their role has not yet been identified. The total number of personnel likely to be involved in implementing each strategy is listed in Table 26.

**Equipment.** A variety of equipment will be required to implement portions of the Water Quality Action Plan. Equipment needs cannot be summarized due to the variety and complexity of activities described. The following strategies are essentially administrative or "desktop" in nature, and should not require equipment purchase:

- W.5: Water Quality Standards
- W.6: NPDES Program Delegation
- W.7: Resource Monitoring of Surface Discharges
- W.8: OSDS Permitting
- W.12: Stormwater Permitting
- W.13: Stormwater Management
- W.16: Spill Reporting
- W.19: Special Studies: Florida Bay Freshwater Flow
- W.29: Dissemination of Findings
- W.32: Technical Advisory Committee

**Contingency Planning for Changing Budgets.** The Water Quality Action Plan includes a wide variety of strategies and activities that will be implemented by various agencies and funded through various mechanisms. A separate study of potential funding sources was conducted by the EPA, and is included in the Water Quality Protection Program Phase II Report. The EPA and FDEP, with guidance from the Technical Advisory Committee (established under strategy W.32), will be responsible for reprioritizing strategies and activities depending on the available funds.

**Evaluating Program Effectiveness.** The EPA and FDEP will report regularly to the Steering Committee on the effectiveness of program activities. Each strategy will be evaluated to determine whether it is being successfully implemented. The evaluation will identify those types of activities which may no longer be useful, and those which have not been adequately addressed. The Steering Committee will meet regularly to review and assess the EPA's and FDEP's evaluation of Program implementation. As required by the National Marine Sanctuaries Program Amendments Act of 1992, the Steering Committee will submit a biennial report to Congress that will:

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- summarize the progress of the Program;
- summarize any modifications to the Program and its recommended actions and plans; and
- incorporate specific recommendations concerning implementation of the Program.



Table 25. Agencies/Organizations Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies/Organizations												
	NOAA	NMFS	EPA	USCG	USGS	NPS	FWS	USACE	FDEP	FDHRS	FDCA	FDACS	FDOT
<b>FLORIDA BAY/EXTERNAL INFLUENCE</b>													
<b>W.19 Florida Bay Freshwater Flow</b>													
Establish Leading Role for Steering Committee	●		●		○		○	○	●		○		○
Participate in Review/Revision of Water Management Strategies	○		●		○		○	○	●		○		○
<b>W.24 Florida Bay Influence</b>													
Conduct Historical Assessment					●		○						●
Conduct Circulation Studies			●						●				
Conduct Ecological Studies			●						●				
<b>DOMESTIC WASTEWATER</b>													
<b>W.1 OSDS Demonstration Project</b>													
Select Alternate OSDS and Test Locations			○						○	●	○		○
Conduct OSDS Demonstration Project			○						○	●	○		○
<b>W.2 AWT Demonstration Project</b>													
Select Specific Technology and Test Location			○						○	●			○
Conduct AWT Pilot Project			○						○	●			○
<b>W.3 Wastewater Management Systems</b>													
Establish Inspection/Compliance Programs for Cesspits, OSDS, and Package Plants			○						○	●			○
Evaluate Development of Nutrient Reduction Targets			●						●	○			○
Develop Sanitary Wastewater Master Plan			●						●	○			○
Implement Master Plan. Examples: • W3d: Construct two community plants • W3d: Upgrade package plants to AWT			○						○	○	○	○	○
<b>W.4 Wastewater Disposal, City of Key West</b>													
Evaluate Disposal and Reuse Options			○						○	○			○
Upgrade Effluent Disposal			○						○	○			○
<b>W.5 Water Quality Standards</b>													
Develop and Evaluate Indicators		●	●						●				
Develop Water Quality Standards			●						●	○			
<b>W.6 NPDES Program Delegation</b>													
Delegate NPDES Program			●						●				
<b>W.7 Resource Monitoring of Surface Discharges</b>													
Require Resource Monitoring			●						●				

● Lead

○ Primary Role

○ Assist

Table 25. Agencies/Organizations Identified for Implementing Strategies/Activities (cont.)

Strategy/Activity	Agencies/Organizations											
	NOAA	NMFS	EPA	USCG	USGS	NPS	FWS	USACE	FDEP	FDHRS	FDCA	FDACS
<b>DOMESTIC WASTEWATER (cont.)</b>												
<b>W.8 OSDS Permitting</b>												
Improve Interagency Coordination			●						●	●		
Combine OSDS Permitting Responsibilities									●	●		
Monitor Revised OSDS Rules									●			
<b>W.9 Laboratory Facilities</b>												
Conduct Feasibility Study									●	●		○
Establish Interagency Laboratory									●	●		○
<b>STORMWATER</b>												
<b>W.11 Stormwater Retrofitting</b>												
Inventory Stormwater Hot Spots									●		●	●
Retrofit Hot Spots and Portions of US 1									●		●	●
<b>W.12 Stormwater Permitting</b>												
Eliminate Permitting Threshold										○		●
<b>W.13 Stormwater Management</b>												
Develop and Enact Stormwater Ordinances and Master Plans										○		●
Petition the EPA to Include the Keys in the Stormwater NPDES Program			○						●			●
<b>W.14 Best Management Practices</b>												
Develop and Implement Best Management Practices and a Public Education Program	○								●	○	○	●
<b>MARINAS AND LIVE-ABOARDS</b>												
<b>B.7 Pollution Discharges</b>												
Implement the 1994 Florida Clean Vessel Act	○		○						●			
Evaluate the need for no-discharge zones	○		●	○					○			○
Establish no-discharge zones	○		●	○					○			○
Develop and Implement a Public Education Program	○		○						●			
Change Environmental Crimes Category	○								●			○
<b>Z.5 Special-use Areas</b>												
Evaluate Feasibility of Mooring Fields	●											○
Establish Criteria for Mooring Fields	●											○
Establish Mooring Fields	●		○						○			○
<b>L.1 Marina Pumpout</b>												
Develop Plan for Sewage Discharge Elimination	○	○	○						○	○		●
Require Marina Pumpout Facilities												●
Enforce Pumpout Use	○		●						○			○
<b>L.6 Mobile Pumpout</b>												
Establish Mobile Pumpout Service			○									●
<b>L.2 Marina Siting and Design</b>												
Improve Interagency Cooperation in Marina Permitting	○							○	●			

● Lead

○ Primary Role

○ Assist

Table 25. Agencies/Organizations Identified for Implementing Strategies/Activities (cont.)

Strategy/Activity	Agencies/Organizations																	
	NOAA	NMFS	EPA	USCG	USGS	NPS	FWS	USACE	FDEP	FDHRS	FDCA	FDACS	FDOT	SFWMD	FKAA	Monroe County	City of K W	Other Municip.
MARINAS AND LIVE-ABOARDS (cont.)																		
<b>L.3 Marina Operations</b>																		
Establish Containment Areas for Boat Maintenance			●						○						○		○	○
Encourage Owners to Participate in Environmentally-Oriented Organizations									○						●		●	●
Encourage Owners to Provide User Manual									○						●		●	●
<b>E.4 Training, Workshops, and School Programs</b>																		
Expand Environmental Awareness Program	○								●									
LANDFILLS																		
<b>L.7 SWD Problem Sites</b>																		
Conduct Historical Landfill Search and Assessment			○						○							●		
Intensify Landfill Monitoring			○						○							●		
Evaluate and Implement Remedial Actions			○						○							●		
HAZARDOUS MATERIALS																		
<b>W.15 HAZMAT Response</b>																		
Develop and Periodically Revise Sanctuary Spill Contingency Plan	○		●						●		○					○		
Improve Coordination and Cooperation	○		●						●		○					○		
Improve Response/Containment Technologies	○		●						●		○					○		
<b>W.16 Spill Reporting</b>																		
Establish Spill Reporting System	○		●						○									
Establish and Maintain Sanctuary Spills Database	●		○						○									
<b>L.10 HAZMAT Handling</b>																		
Conduct HAZMAT Assessment/Inventory			○						●		○				○			
MOSQUITO SPRAYING																		
<b>W.17 Mosquito Spraying</b>																		
Review Aerial Spraying Threshold											○	●						
Review Flight Plans and Equipment											○	●						
Reconsider Larvicide Use											○	●						
Evaluate Ultra-low-volume Methods											○	●						
<b>W.18 Pesticide Research</b>																		
Research Impacts and Alternatives									○		○	●						
Modify Mosquito Control Program									○		○	●						
Conduct Field Survey of Pesticide and Herbicide Use									○		○	●						
CANALS																		
<b>W.10 Canal WQ</b>																		
Evaluate and Revise Hot Spot List			○						○						●	○	○	
Inventory and Characterize Canals			○						○						○	○	○	
Develop and Evaluate Improvement Strategies			○						○						○	○	○	
Revise FDEP Permit Criteria			○						○						○	○	○	
Identify and Compile Technologies			○						○						○	○	○	
Develop Community Education and Involvement Program			○						○						○	○	○	
Conduct Canal System Restoration Pilot Project			○						○						○	○	○	
Implement Improvement Strategies			○						○						○	○	○	
● Lead      ○ Primary Role      ○ Assist																		

● Lead

○ Primary Role

○ Assist

Table 25. Agencies/Organizations Identified for Implementing Strategies/Activities (cont.)

Strategy/Activity	Agencies/Organizations																	
	NOAA	NMFS	EPA	USCG	USGS	NPS	FWS	USACE	FDEP	FDHRS	FDCA	FDACS	FDOT	SFWMD	FKAA	Monroe County	City of K W	Other Municip.
MONITORING AND SPECIAL STUDIES																		
<b>W.20 Monitoring</b>																		
Develop Monitoring Implementation Plan			●						●									
Select Organization/Institution to Conduct Monitoring			●						●									
Establish QA/QC Authority and Protocols			●						●									
Implement Monitoring			●						●									
<b>W.21 Predictive Models</b>																		
Conduct a Modeling Workshop			●						●									
Develop a Modeling Implementation Plan			●		○				●				○					
<b>W.22 Wastewater Pollutants</b>																		
Detect Wastewater Pollutants and Ecological Impacts	●		●						●							○		
<b>W.23 Special Studies</b>																		
Estimate Other Pollutant Loadings	○		●	○					●							○		
Identify Causal Linkages Between Pollutants and Ecological Impacts	○		●	○					●							○		
Develop and Evaluate Innovative Monitoring Tools	●		●						●									
Conduct Research on Global Change	●		○				○		○									
<b>W.28 Regional Database</b>																		
Conduct User Needs Assessment	●		●						●									
Develop Implementation Plan	●		●						●									
Implement and Maintain Data Management System	●		●						●									
<b>W.29 Dissemination of Findings</b>																		
Establish Information Exchange Network	●		●						●									
Sponsor Conferences	●		●						●									
Support Journal Publication	●		●						●									
Disseminate Findings to the Public	●		●						●									
<b>W.32 Technical Advisory Committee</b>																		
Establish Technical Advisory Committee	●		●						●									
<b>W.33 Ecological Monitoring Program</b>	Refer to Research and Monitoring Action Plan																	

● Lead    ○ Primary Role    ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; NMFS, National Marine Fisheries Service; EPA, U.S. Environmental Protection Agency; USCG, U.S. Coast Guard; USGS, U.S. Geological Survey; NPS, National Park Service; FWS, U.S. Fish and Wildlife Service; USACE, U.S. Army Corp of Engineers; FDEP, Florida Department of Environmental Protection; FDHRS, Florida Department of Health and Rehabilitative Services; FDCA, Florida Department of Consumer Affairs; FDACS, Florida Department of Agriculture and Consumer Services; FDOT, Florida Department of Transportation; SFWMD, South Florida Water Management District; City of K.W., City of Key West; Other Municip., Other Municipalities.

Table 26. Requirements for Implementation

Strategy/Activity	Priority	Implementation				Cost to Complete				Geographic Focus	# of Personnel
		Planned Level of Activity in Year 1	Months to Complete	Funding Available to Complete	Institutional		Engineering/Facilities				
					Capital (\$1,000)	Operations/Maint. (\$1,000)	Capital (\$1,000)	Operations/Maintenance (\$1,000)			
FLORIDA BAY/EXTERNAL INFLUENCE											
W.19 Florida Bay Freshwater Flow	●	Medium	36+	100%	NC	10-99					1-2
Establish Leading Role for Steering Committee		Done	0	100%	NC	10-99				SW	
Participate in Review/Revision of Water Management Strategies		Medium	36+	100%	NC	10-99				SW	
W.24 Florida Bay Influence	●	High	48	<50%	NC	100-999+					3-5
Conduct Historical Assessment		High	12	<50%	NC	10-99				SW	
Conduct Circulation Studies		High	48	<50%	NC	100-999				SW	
Conduct Ecological Studies		Low	36	<50%	NC	100-999				SW	
DOMESTIC WASTEWATER											
W.1 OSDS Demonstration Project	●	High	36	100%	10-99	10-99	30-60	25-50			1-2
Select Alternate OSDS and Test Locations		Done	0	100%	NC	1-9				UK, MK	
Conduct OSDS Demonstration Project		Low	36	100%	10-99	10-99	30-60	25-50		UK, MK	
W.2 AWT Demonstration Project	●	None	36	<50%	10-99	10-99	300-600	17-33			1-2
Select Specific Technology and Test Location		None	12	<50%	NC	1-9				UK, MK	
Conduct AWT Pilot Project		None	36	<50%	10-99	10-99	300-600	17-33		UK, MK	
W.3 Wastewater Management Systems	●	High	36+	<50%	5,000-10,000	1,000-5,000	113,000-241,000	5,250			3-5
Establish Inspection/Compliance for Cesspits, OSDS, and Package Plants		High	36	<50%	NC	100-999	57,000	NC		SW	3-5
Evaluate Development of Nutrient Reduction Targets		High	12	<50%	NC	10-99				SW	
Develop Sanitary Wastewater Master Plan		None	36	<50%	NC	10-99				SW	
Implement Master Plan. Examples:		None	?	0%							
• W3d: Construct two community plants					5,000-10,000	1,000-5,000	184,000	5,250		SW	11-25
• W3d: Upgrade package plants to AWT					NC	10-99	56,000	400		SW	1-2
W.4 Wastewater Disposal, City of Key West	●	Low	48	<50%	NC	100-999	7,000	225			3-5
Evaluate Disposal and Reuse Options		Low	12	?	NC	100-999					
Upgrade Effluent Disposal		None	48	<50%			7,000	225		LK	
W.5 Water Quality Standards	○	Low	60+	<50%	NC	100-999					3-5
Develop and Evaluate Indicators		Low	36	<50%	NC	100-999				SW	
Develop Water Quality Standards		None	60+	<50%	NC	10-99				SW	
W.6 NPDES Program Delegation	★	Done	0	100%	NC	10-99					1-2
Delegate NPDES Program		Done	0	100%	NC	10-99				SW	
W.7 Resource Monitoring of Surface Discharges	★	Low	36	100%	NC	10-99					1-2
Require Resource Monitoring		Low	36	100%	NC	10-99				SW	

Abbreviations: SW, Sanctuary Wide; UK, Upper Keys; MK, Middle Keys; LK, Lower Keys.

Priority: ● = High ○ = Medium ★ = Low

Table 26. Requirements for Implementation (cont.)

Strategy/Activity	Priority	Implementation				Cost to Complete				Geographic Focus	# of Personnel
		Planned Level of Activity in Year 1	Months to Complete	Funding Available to Complete	Institutional		Engineering/Facilities				
					Capital (\$1,000)	Operations/Maint. (\$1,000)	Capital (\$1,000)	Operations/Maint. (\$1,000)			
DOMESTIC WASTEWATER (cont.)											
W.8 OSDS Permitting	★	None	36	100%	NC	100-999					3-5
Improve Interagency Coordination		None	24	100%	NC	10-99				SW	
Combine OSDS Permitting Responsibilities		None	36	?	NC	10-99				SW	
Monitor Revised OSDS Rules		None	36	?	NC	10-99				SW	
W.9 Laboratory Facilities	★	None	36	<50%	10-99	100-999					3-5
Conduct Feasibility Study		None	12	<50%	10-99	10-99				MK	
Establish Interagency Laboratory		None	36	<50%	10-99	100-999				MK	
STORMWATER											
W.11 Stormwater Retrofitting	○	Low	60+	<50%	>10,000	>5,000	80,000	8,000			8-10
Inventory Stormwater Hotspots		Low	12	<50%	NC	10-99				SW	
Retrofit Hotspots and Portions of US 1		None	60+	0	>10,000	>5,000	80,000	8,000		SW	
W.12 Stormwater Permitting	○	Done	0	100%	NC	NC					None
Eliminate Permitting Threshold		Done	0	100%	NC	NC				SW	
W.13 Stormwater Management	○	Medium	24	100%	NC	100-999					1-2
Develop and Enact Stormwater Ordinances and Master Plans		Medium	12	100%	NC	100-999				SW	
Petition EPA to Include the Florida Keys in the Stormwater NPDES Program		None	24	100%	NC	10-99				SW	
W.14 Best Management Practices	○	Low	36	<50%	100-999	1,000-5,000					3-5
Develop and Implement Best Management Practices and Public Education Program		Low	36	<50%	100-999	1,000-5,000				SW	
MARINAS AND LIVE-ABOARDS											
B.7 Pollution Discharges	○	Low	36	<50%	NC	100-999					3-5
Implement 1994 Florida Clean Vessel Act		Low	12	?	NC	10-99				SW	
Evaluate the Need for No-discharge Zones		Low	12								
Establish No-discharge Zones		None	48								
Develop and Implement a Public Education Program		Low	12	?	NC	10-99				SW	
Change Environmental Crimes Category		None	36	<50%	NC	10-99				SW	
Z.5 Special-Use Areas	○	Low	36	<50%	?	?					?
Evaluate Feasibility of Mooring Fields		Low	12	<50%	NC	10-99				SW	
Establish Criteria for Mooring Fields		None	12	<50%	NC	10-99				SW	
Establish Mooring Fields		None	36	<50%	?	?				SW	
L.1 Marina Pumpout	●	Low	60	<50%	NC	100-999					3-5
Develop Plan for Sewage Discharge Elimination		Low	12	100%	NC	10-99				SW	
Require Marina Pumpout Facilities		None	36	100%	NC	10-99				SW	
Enforce Pumpout Use		None	60	<50%	NC	10-99				SW	
L.6 Mobile Pumpout	○	None	36	<50%	NC	10-99					3-5
Establish Mobile Pumpout Service		None	36	<50%	NC	10-99				SW	
L.2 Marina Siting and Design	★	None	36	100%	NC	10-99					3-5
Improve Interagency Cooperation in Marina Permitting		None	36	100%	NC	10-99				SW	

Abbreviations: SW, Sanctuary Wide; UK, Upper Keys; MK, Middle Keys; LK, Lower Keys.

Priority: ● = High ○ = Medium ★ = Low

Table 26. Requirements for Implementation (cont.)

Strategy/Activity	Priority	Implementation			Cost to Complete				Geographic Focus	# of Personnel	
		Planned Level of Activity in Year 1	Months to Complete	Funding Available to Complete	Institutional		Engineering/Facilities				
					Capital (\$1,000)	Operations/Maint. (\$1,000)	Capital (\$1,000)	Operations/Maint. (\$1,000)			
MARINAS AND LIVE-ABOARDS (cont.)											
<b>L.3 Marina Operations</b>	●	None	36	<50%	NC	10-99				3-5	
Establish Containment Areas for Boat Maintenance		None	36	<50%	NC	10-99			SW		
Encourage Owners to Participate in Environmental Organizations		None	12	100%	NC	NC			SW		
Encourage Marina Owners to Provide User Manual with Local Environmental Information		None	12	100%	NC	NC			SW		
<b>E.4 Training/Workshops/School Programs</b>	●	Medium	24	<50%	10	5				1-2	
Expand Environmental Awareness Program		Medium	24	<50%	10	5			SW		
LANDFILLS											
<b>L.7 SWD Problem Sites</b>	●	None	60+	<50%	<10	1,000-5,000				1-2	
Conduct Historical Landfill Search and Assessment		None	36	<50%	NC	10-99			SW		
Intensify Landfill Monitoring		None	36	<50%	<10	10-99			SW		
Evaluate and Implement Remedial Actions		None	60+	<50%	<10	1,000-5,000			SW		
HAZARDOUS MATERIALS											
<b>W.15 HAZMAT Response</b>	●	Low	36	<50%	10-99	100-999				1-2	
Develop and Periodically Revise Sanctuary Spill Contingency Plan		None	36	<50%	10-99	10-99			SW		
Improve Coordination and Cooperation		Low	12	100%	NC	10-99			SW		
Improve Response/Containment Technologies		None	36	<50%	10-99	10-99			SW		
<b>W.16 Spill Reporting</b>	★	Low	24	<50%	<10	10-99				1-2	
Establish Spill Reporting System		Low	12	?	NC	10-99			SW		
Establish and Maintain Sanctuary Spill Database		None	24	<50%	<10	10-99			SW		
<b>L.10 HAZMAT Handling</b>	●	None	36	?	NC	10-99				1-2	
Conduct HAZMAT Assessment/Inventory		None	36	?	NC	10-99			SW		
MOSQUITO SPRAYING											
<b>W.17 Mosquito Spraying</b>	●	High	12	75-99%	10-99	10-99				3-5	
Review Aerial Spraying Threshold		High	12	75-99%	NC	10-99			SW		
Review Flight Plans and Equipment		High	12	75-99%	10-99	10-99			SW		
Reconsider Larvicide Use		High	12	75-99%	NC	10-99			SW		
Evaluate Ultra-low-volume Methods		High	12	75-99%	NC	10-99			SW		
<b>W.18 Pesticide Research</b>	●	None	36+	<50%	NC	100-999				3-5	
Research Impacts and Alternatives		None	36	<50%	NC	100-999			SW		
Modify Mosquito Control Program		None	36+	<50%	?	?			SW		
Conduct Field Survey of Pesticide and Herbicide Use		None	12	<50%	NC	100-999			SW		
CANALS											
<b>W.10 Canal WQ</b>	●	Low	60+	<50%	100-999	100-999				1-2	
Evaluate and Revise Hot Spot List		Low	12	<50%	NC	10-99			SW		
Inventory and Characterize Canals		None	12	<50%	NC	10-99			SW		
Develop and Evaluate Improvement Strategies		None	24	<50%	10-99	10-99			SW		
Revise FDEP Permit Criteria		None	12	100%	NC	10-99			SW		
Identify and Compile Technologies		None	12	<50%	NC	10-99			SW		
Develop Community Education and Involvement Program		None	12	<50%	NC	10-99			SW		
Conduct Canal System Restoration Pilot Project		None	12	<50%	100-999	100-999			SW		
Implement Improvement Strategies		None	60	<50%	100-999	100-999			SW		

Abbreviations: SW, Sanctuary Wide; UK, Upper Keys; MK, Middle Keys; LK, Lower Keys.

Priority: ● = High ○ = Medium ★ = Low

Table 26. Requirements for Implementation (cont.)

Strategy/Activity	Priority	Implementation			Cost to Complete				Geographic Focus	# of Personnel
		Planned Level of Activity in Year 1	Months to Complete	Funding Available to Complete	Institutional		Engineering/Facilities			
					Capital (\$1,000)	Operations/Maint (\$1,000)	Capital (\$1,000)	Operations/Maint (\$1,000)		
MONITORING AND SPECIAL STUDIES										
W.20 Monitoring	●	High	60+	<50%	NC	5,000+				3-5
Develop Monitoring Implementation Plan		Done	0	100%	NC	10-99			SW	
Identify Organization/Institution to Conduct Monitoring		Done	0	100%	NC	<10			SW	
Establish QA/QC Authority and Protocols		Done	0	100%	NC	10-99			SW	
Implement Monitoring		Low	60+	<50%	NC	5,000+			SW	
W.21 Predictive Models	●	High	12+	<50%	NC	100-999				3-5
Conduct Modeling Workshops		High	12	<50%	NC	10-99			SW	
Develop Modeling Implementation Plan		High	12+	<50%	NC	10-99			SW	
W.22 Wastewater Pollutants	●	Low	36	<50%	NC	100-999				3-5
Detect Wastewater Pollutants and Ecological Impacts		Low	36	<50%	NC	100-999			SW	
W.23 Special Studies	●	None	36	<50%	NC	100-999				3-5
Estimate Other Pollutant Loadings		None	36	<50%	NC	100-999			SW	
Identify Causal Linkages Between Pollutants and Ecological Impacts		None	36	<50%	NC	100-999			SW	
Develop and Evaluate Other Monitoring Tools		None	36	<50%	NC	100-999			SW	
Conduct Research on Global Change		None	36	<50%	NC	100-999			SW	
W.28 Regional Database	●	High	60+	<50%	<10	10-99				1-2
Conduct User Needs Assessment		Done	0	100%	NC	10-99			SW	
Develop Implementation Plan		Done	0	100%	<10	10-99			SW	
Implement and Maintain Data Management System		Low	60+	<50%	<10	10-99			SW	
W.29 Dissemination of Findings	★	Low	60+	<50%	<10	100-999				3-5
Establish Information Exchange Network		Low	12	<50%	<10	10-99			SW	
Sponsor Conferences		None	60+	<50%	NC	10-99			SW	
Support Journal Publication		None	60+	<50%	NC	10-99			SW	
Disseminate Findings to the Public		None	60+	<50%	NC	10-99			SW	
W.32 Technical Advisory Committee	●	Done	0	100%	NC	10-99				3-5
Establish Technical Advisory Committee		Done	0	100%	NC	10-99			SW	
W.33 Ecological Monitoring Program		Refer to Research and Monitoring Action Plan								

Abbreviations: SW, Sanctuary Wide; UK, Upper Keys; MK, Middle Keys; LK, Lower Keys.

Priority: ● = High ● = Medium ★ = Low



Table 27. Rationale for the High Priority Level of Water Quality Strategies

Strategy/Activity	Rationale
<b>FLORIDA BAY/EXTERNAL INFLUENCES</b>	
<b>W.19 Florida Bay Freshwater Flow</b> <ul style="list-style-type: none"> <li>Establish Leading Role for Steering Committee</li> <li>Participate in Review/Revision of Water Management Strategies</li> </ul>	Addresses a potentially major, external influence on water quality in the Sanctuary. The Sanctuary must be involved in decisions affecting its jurisdiction.
<b>W.24 Florida Bay Influence</b> <ul style="list-style-type: none"> <li>Conduct Historical Assessment</li> <li>Conduct Circulation Studies</li> <li>Conduct Ecological Studies</li> </ul>	Addresses a potentially major, external influence on water quality in the Sanctuary. Understanding Florida Bay influence must be considered in decisions regarding wastewater management systems (strategy W.3) and in restoring freshwater flow to Florida Bay (strategy W.19).
<b>DOMESTIC WASTEWATER</b>	
<b>W.1 OSDS Demonstration Project</b> <ul style="list-style-type: none"> <li>Select Alternate OSDS and Test Locations</li> <li>Conduct OSDS Demonstration Project</li> </ul>	Provides critical information for decisions regarding wastewater management systems (strategy W.3).
<b>W.2 AWT Demonstration Project</b> <ul style="list-style-type: none"> <li>Select Specific Technology and Test Location</li> <li>Conduct AWT Pilot Project</li> </ul>	Provides critical information for decisions regarding wastewater management systems (strategy W.3).
<b>W.3 Wastewater Management Systems</b> <ul style="list-style-type: none"> <li>Establish Inspection/Compliance Programs for Cesspits, OSDS, and Package Plants</li> <li>Evaluate Development of Nutrient Reduction Targets</li> <li>Develop Sanitary Wastewater Master Plan</li> <li>Implement Master Plan</li> </ul>	Will lead to major reductions in wastewater nutrient loading to Sanctuary waters through enforcing existing standards, upgrading existing systems, and/or constructing community wastewater plants.
<b>W.4 Wastewater Disposal, City of Key West</b> <ul style="list-style-type: none"> <li>Evaluate Disposal and Reuse Options</li> <li>Upgrade Effluent Disposal</li> </ul>	Directly reduces nutrient loadings to surface waters.
<b>W.22 Wastewater Pollutants</b> <ul style="list-style-type: none"> <li>Detect Wastewater Pollutants and Ecological Impacts</li> </ul>	Provides critical information for decisions regarding wastewater management systems (strategy W.3). Provides critical information about cause/effect relationships linking wastewater pollutants and Sanctuary resources.
<b>MARINAS AND LIVE-ABOARDS</b>	
<b>L.1 Marina Pumpout</b> <ul style="list-style-type: none"> <li>Develop Plan for Sewage Discharge Elimination</li> <li>Require Marina Pumpout Facilities</li> <li>Enforce Pumpout Use</li> </ul>	Develops and implements a coordinated plan to directly reduce nutrient loadings from live-aboards and other boaters, which can contribute to water quality degradation in confined waters.
<b>MOSQUITO SPRAYING</b>	
<b>W.17 Mosquito Spraying</b> <ul style="list-style-type: none"> <li>Review Aerial Spraying Threshold</li> <li>Review Flight Plans and Equipment</li> <li>Reconsider Larvicide Use</li> <li>Evaluate Ultra-low-volume Methods</li> </ul>	Reduces aerial spraying of pesticides, leading to reduced inputs of pesticides and diesel oil to the marine environment.
<b>W.18 Pesticide Research</b> <ul style="list-style-type: none"> <li>Research Impacts and Alternatives</li> <li>Modify Mosquito Control Program</li> <li>Conduct Field Survey of Pesticide and Herbicide Use</li> </ul>	Evaluates alternatives to minimize impacts of current pesticide practices.

Table 27. *Rationale for the High Priority Level of Water Quality Strategies (cont.)*

Strategy/Activity	Rationale
<b>CANALS</b>	
<b>W.10 Canal WQ</b> <ul style="list-style-type: none"> <li>• Evaluate and Revise Hot Spot List</li> <li>• Inventory and Characterize Canals</li> <li>• Develop and Evaluate Improvement Strategies</li> <li>• Revise FDEP Permit Criteria</li> <li>• Identify and Compile Technologies</li> <li>• Develop Community Education and Involvement Program</li> <li>• Conduct Canal System Restoration Pilot Project</li> <li>• Implement Improvement Strategies</li> </ul>	Addresses documented water quality degradation in canals.
<b>MONITORING AND SPECIAL STUDIES</b>	
<b>W.20 Monitoring</b> <ul style="list-style-type: none"> <li>• Develop Monitoring Implementation Plan</li> <li>• Identify Organization/Institution to Conduct Monitoring</li> <li>• Establish QA/QC Authority and Protocols</li> <li>• Implement Monitoring</li> </ul>	Provides critical data on long-term status and trends in water quality and biological resources for management decisions. The monitoring program is required by the Florida Keys National Marine Sanctuary and Protection Act.
<b>W.21 Predictive Models</b> <ul style="list-style-type: none"> <li>• Conduct a Modeling Workshop</li> <li>• Develop a Modeling Implementation Plan</li> </ul>	Provides critical guidance to resource managers.
<b>W.22 Wastewater Pollutants</b> <ul style="list-style-type: none"> <li>• Detect Wastewater Pollutants and Ecological Impacts</li> </ul>	(see above, Domestic Wastewater)
<b>W.24 Florida Bay Influence</b> <ul style="list-style-type: none"> <li>• Conduct Historical Assessment</li> <li>• Conduct Circulation Studies</li> <li>• Conduct Ecological Studies</li> </ul>	(see above, Florida Bay/External Influences)
<b>W.28 Regional Database</b> <ul style="list-style-type: none"> <li>• Conduct User Needs Assessment</li> <li>• Develop Implementation Plan</li> <li>• Implement Data Management System</li> </ul>	Data management is an integral part of all monitoring and special studies efforts; must be developed before field/lab work begins.
<b>W.32 Technical Advisory Committee</b> <ul style="list-style-type: none"> <li>• Establish Technical Advisory Committee</li> </ul>	Establishes technical (scientific and resource management) oversight for all monitoring and special studies efforts.
<b>W.33 Ecological Monitoring Program</b>	Provides critical information on the health of living resources and the ecosystem, causal relationships related to management decisions, and the effectiveness of management actions. The ecological monitoring program is required by the Florida Keys National Marine Sanctuary and Protection Act.

# Zoning Action Plan

***This action plan identifies the zoning strategies that will be implemented in the Sanctuary. The strategies in the plan are derived from Alternative III, the most balanced of the management alternatives. For each strategy, the time required for implementation, funding availability, level of activity in year 1, costs, and responsible parties are outlined. Maps showing the location of each zone are also included in this plan. Table 28 summarizes key information about zoning strategies.***

## Introduction

The consideration of temporal and geographic zoning to ensure protection of Sanctuary resources is mandated under Section 7 (a) (2) of the Florida Keys National Marine Sanctuary and Protection Act. Marine zoning is a management tool that has been used around the world to protect sensitive marine resources from overuse and to separate conflicting visitor uses. Marine zoning is being implemented in the Florida Keys National Marine Sanctuary to assist in the protection of the biological diversity of the marine environment in the Keys. In addition, marine zoning will disperse uses of the resources in such a way as to reduce user conflicts and lessen the concentrated impact to marine organisms on heavily used reefs. As a management tool, marine zoning allows the sanctuary to focus the majority of its management efforts on a small portion of the sanctuary while addressing water quality and habitat degradation in the broader unzoned portions of the area.

In addition to the Existing Management Areas in the Keys (national wildlife refuges, state parks, etc.), Wildlife Management Areas, Ecological Reserves,

Sanctuary Preservation Areas, and Special-use Areas are established to ensure protection of Sanctuary resources. Each of these zone types is designed to reduce damage to resources and threats to environmental quality, while allowing uses that are compatible with resource protection. The zones will protect habitats and species by limiting consumptive and/or conflicting user activities, and allowing resources to evolve in a natural state, with minimum human influence. This plan outlines the process for establishing the zones. Prioritizing zone marking, marking zone boundaries, and managing zones are also each discussed.

The term *Ecological Reserves* replaces the term *Replenishment Reserves* in the FMP/EIS. NOAA has changed the name to reflect public concerns over the purpose of these areas, however, the objective and definition of this zone type remains the same. The main purpose of *Ecological Reserves* is to protect biodiversity by setting aside areas with minimal human disturbance. These zones will serve to protect and enhance the spawning, nursery or permanent resident areas of fish and other marine life. Hundreds of marine species are not protected by any form of management and the *Ecological Reserves* will provide protection and allow areas to return to their natural state. These areas will additionally protect the food and home of commercially and recreationally important species of marine life. The objective and definition of this zone type remains the same.

The five zone types which will be implemented in the Sanctuary are:

***Wildlife Management Areas.*** These areas are established to minimize disturbance to especially sensitive wildlife populations and their habitats to ensure

**Table 28. Summary of Zoning Strategies**

Page	Strategies	Overall Sanctuary Priority Level	Planned Level of Action in Year 1	Months to Complete	Funding for Full Implementation	Number of Activities to be Undertaken	Number of Institutions
259	Zoning						
259	Z.1 Wildlife Management Areas	*	High	--	75%	4	7
260	Z.2 Ecological Reserves	High	High	12+	<50%	3	3
261	Z.3 Sanctuary Preservation Areas	High	Medium	18+	<50%	4	4
263	Z.4 Existing Management Areas			Refer to Regulatory Action Plan			
263	Z.5 Special-use Areas	Medium	Low	12+	<50%	7	4

\* Strategies with an "\*" for Overall Sanctuary Priority Level are already existing programs and/or will be completed in the first year of Sanctuary operation.

protection and preservation consistent with the Sanctuary designation and other applicable laws governing the protection and preservation of wildlife resources in the Sanctuary. Such areas would include bird nesting, resting, or feeding areas and turtle nesting beaches. Regulations governing access are designed to protect endangered or threatened species or their habitats, while providing opportunities for public use. Access restrictions include no-access buffer zones, no-motor zones, idle speed only/no wake zones, and closed zones. Twenty of the twenty-seven areas are under the management of the U.S. Fish and Wildlife Service and are contained in this plan as an integrated ecosystem management approach to resource protection. These areas are located within the Great White Heron, Key West, Key Deer, and Crocodile Lakes National Wildlife Refuges managed by the U.S. Fish and Wildlife Service.

*Ecological Reserves.* These areas are designed to encompass large, contiguous diverse habitats. They are intended to provide natural spawning, nursery, and permanent residence areas for the replenishment and genetic protection of marine life and to protect and preserve all habitats and species particularly those not protected by fishery management regulations. These reserves are intended to protect areas that represent the full range of diversity of resources and habitats found throughout the Sanctuary. The intent is to meet these objectives by limiting consumptive activities, while continuing to allow activities that are compatible with resource protection. This will provide the opportunity for these areas to evolve in a natural state, with a minimum of human influence. These zones will protect a limited number of areas that provide important habitat for sustaining natural resources such as fish and invertebrates.

The following is a list of criteria that was developed by the Sanctuary Advisory Council. These criteria were used to site the proposed Ecological Reserves in the DMP/EIS and were reconsidered along with public comment for this final plan.

- Consider areas of high habitat and species diversity representative of the Florida Keys marine ecosystem.
- Consider environmental and socio-economic impacts on other areas resulting from displacing existing uses.
- Consider long-term impacts from establishing ecological reserves in areas of critical economic value.

- Consider areas with good water quality.
- Consider socioeconomic impact on displaced user groups.
- Consider ownership of nearby waterfront property.
- Consider sufficient size to include range of habitats.
- Consider other areas within and adjacent to the Sanctuary with existing or proposed restrictions.
- Consider existing managed areas.

In addition to the aforementioned criteria, there are the statutory criteria under the FKNMSPA for protecting resources and facilitating multiple use, and under NEPA, for considering the environmental consequences including the socio-economic impacts.

*Sanctuary Preservation Areas.* These areas will focus on the protection of shallow, heavily used reefs where conflicts occur between user groups, and where concentrated visitor activity leads to resource degradation. They are designed to enhance the reproductive capabilities of renewable resources, protect areas critical for sustaining and protecting important marine species, and reduce user conflicts in high-use areas. This will be accomplished through a prohibition of consumptive activities within these areas. They have been chosen based on the status of important habitat, the ability of a particular area to sustain and protect the habitat, the level of visitor use, and the degree of conflict between consumptive and nonconsumptive users. The actual size and location of these zones have been determined by examination of user patterns, aerial photography, and ground-truthing of specific habitats.

The following is a list of criteria that was developed by the Sanctuary Advisory Council. These criteria were used to site the proposed Sanctuary Preservation Areas in the DMP/EIS and were reconsidered along with public comment for this final plan.

- Protect representative locations of the most rare habitats (i.e. reefs.)
- Consider long term impacts on areas of critical economic value.
- Protect areas that are buffered from poor water quality.

- Consider the accessibility of areas to fisherman and other user groups.
- Minimize conflicts.
- Provide geographic spread.
- Sufficient size to ensure viability.
- Research potential/control areas.

In addition to the aforementioned criteria, there are the statutory criteria under the FKNMSPA for protecting resources and facilitating multiple use, and under NEPA, for considering the environmental consequences including the socioeconomic impacts.

**Existing Management Areas.** This zone simply identifies areas that are managed by other agencies where restrictions already exist. These zones delineate the existing jurisdictional authority of other agencies (i.e., State parks, aquatic preserves, sanctuaries, and other restricted areas). Management of these areas within the Sanctuary may require additional regulations or restrictions to adequately protect resources. Any additional management measures will be developed and implemented in coordination with the agency having jurisdictional authority. Their function is not to establish another layer of bureaucracy, but to recognize established management areas and, at a minimum, to complement the existing management programs, ensuring cooperation and coordination with other agencies.

**Special-use Areas.** These zones are used to set aside areas for scientific research and educational purposes, restoration, monitoring, or to establish areas that confine or restrict activities such as commercial personal watercraft operations and establish live-aboard mooring fields. These areas will minimize impacts on sensitive habitats and reduce user conflicts. Special management programs (e.g., monitoring, research, special-use permits and restoration) can be conducted without impediment in these areas. They can be used to set aside areas for specific uses such as long-term research and monitoring and/or minimizing the adverse environmental effects of high-impact activities. These zones will be limited in their length of duration.

**How the Plan is Organized.** This action plan is organized in four sections: an introduction, description of strategies, a summary of implementation procedures, and a series of maps showing the various zones in the Sanctuary. The introduction

summarizes the goals and objectives of the Zoning Program, and provides background information on planning efforts. The strategy description section groups activities by strategy, based on the five types of management zones. For each strategy and component activity, the priority level, funding availability, costs, and timing of implementation are summarized. The implementation section details how the strategies in the plan will be placed into action. The final section includes a map of each zone, and an accompanying description of the area.

## Background

**Management Strategies.** Each strategy has been assigned an estimated activity level for year 1 (high, medium, low, or none) that represents an estimate of the planned level of action that will occur in the first year after the Management Plan is adopted. In addition, the time required for implementation, costs of implementation, and available funding (Federal, State, local, and private) have been estimated for each strategy. The component activities in each strategy, and the institutions responsible for implementing these activities, have also been identified.

The strategies for the Management Plan, which includes the Zoning Action Plan and all other action plans combined, have been grouped into three priority levels, based on their relative importance or feasibility. A strategy's priority level is based on factors such as available funding, costs, personnel requirements, timing, levels of existing implementation, and existing legislative/regulatory authority. The high priority level includes the 16 most important strategies. The medium priority level contains 36 strategies that represent the next level of importance to the Sanctuary and will have some level of activity in year one. Low priority items contain the remaining strategies in the Management Plan. Those strategies planned for completion in or before year one do not have a priority level.

**Zoning Strategies.** The strategies delineating Ecological Reserves and Sanctuary Preservation Areas are considered priority level 1. The activities described for those strategies will have a high level of action in year 1 for the Western Sambos Ecological Reserve and a medium level of action for selected Sanctuary Preservation Areas. The Special-use Areas strategy is considered high priority level, and will also have a low level of action in year 1. Wildlife Management Areas and Existing Management Areas will both be established in year 1 and, accordingly, have not been assigned a priority level.

## Action Plans: Zoning

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NOAA will be the primary funding source for all strategies, except for marking Wildlife Management Areas in national wildlife refuges. The marking of these zones may have to be implemented gradually as funds become available for installation of markers.

**Five-year Zoning Plan Review.** The Sanctuary's zoning program will be evaluated in the five-year update of the Management Plan, the effectiveness of the zones will be determined, and consideration will be given to modifying or eliminating zones at this time.

**Relationship to Other Action Plans.** This plan describes the process of prioritizing zones for marking, obtaining the information necessary to mark boundaries, and the method of marking these boundaries. The associated regulations are described in the Regulatory Action Plan. In addition, research and monitoring will be conducted within Sanctuary Preservation Areas, Ecological Reserves, and Special-use Areas to provide information for better management. This may result in zone modifications as part of the continuous management process. These activities are described in the Research and Monitoring Action Plan. Finally, the establishment of live-aboard mooring fields as Special-use Areas is described in the Water Quality Action Plan. This activity would establish designated mooring fields or anchorage areas in places with significant concentrations of live-aboard vessels.

## Goals and Objectives

**Sanctuary Goals.** Zoning is critical to achieving the Sanctuary's primary goal of resource protection. Its purpose is to protect and preserve sensitive components of the ecosystem by regulating within the zoned areas, while facilitating activities compatible with resource protection. Zoning will ensure that areas of high ecological importance will evolve in a natural state, with minimal human influence. Zoning will also promote sustainable use of the Sanctuary resources, and will protect areas representing diverse Sanctuary habitats and areas important for maintaining natural resources (e.g., fishes, invertebrates, etc.) and ecosystem functions.

**Sanctuary Objectives.** To achieve these goals, the following objectives must be accomplished:

- protect biological diversity and the quality of resources by protecting large, contiguous diverse habitats that are intended to provide natural spawning, nursery, and permanent residence areas for the replenishment and genetic protection of marine life and to protect and preserve all habitats and species;
  - minimize conflicting uses;
  - protect Sanctuary resources and separate conflicting uses by establishing a number of non-consumptive zones in areas that are experiencing conflict between consumptive and non-consumptive uses and in areas that are experiencing significant population or habitat declines;
  - eliminate injury to critical/sensitive habitats;
  - disperse concentrated harvests of marine organisms;
  - prevent heavy concentrations of uses that degrade Sanctuary resources;
  - provide undisturbed monitoring sites for research activities by setting areas aside for scientific research, monitoring, and restoration; and
  - provide control sites to help determine the effects of human activities on resources.
- 
- reduce stresses from human activities by establishing areas that restrict access to especially sensitive wildlife populations and habitats;

## Description of Strategies

### Zoning

This Final plan contains five strategies from Management Alternative III. The first zone type recognizes 27 Wildlife Management Areas. The second establishes one Ecological Reserve and commits NOAA to completing the establishment of a second within a two year time frame. The third establishes 18 Sanctuary Preservation Areas. The fourth identifies 21 Existing Management Areas, and the fifth designates four Special-use Areas.

### Strategy Z.1: Wildlife Management Areas

This strategy establishes Wildlife Management Areas that restrict access to sensitive wildlife populations and habitats. Such areas include bird nesting, resting, or feeding areas, turtle nesting beaches, and

other sensitive habitats. Restrictions prohibit use, modify the way areas are used or accessed, and specify time periods when use is prohibited.  
(Completed in Year 1)

This strategy includes 27 areas, 20 that are part of the Fish and Wildlife Service's (FWS) plan for managing backcountry portions of the Key West National Wildlife Refuge, Great White Heron National Wildlife Refuge, and Crocodile Lake Wildlife Refuge. The areas were established through a March 1993 agreement between the FWS and the Florida Department of Environmental Protection (FDEP). The FWS is currently marking the 20 areas with buoys and/or signs, and will administer these areas. NOAA, the FDEP, and Monroe County will be responsible for marking and managing the remaining seven areas. An additional WMA has been established in Eastern Lake Surprise (east of US 1) to manage vessel traffic in that area to protect the American Crocodile and West Indian manatees.

#### Zoning Management Strategies

##### Z.1: Wildlife Management Areas

- Prioritize zone marking
- Determine boundaries on-site
- Place buoys/signs along zone boundaries
- Establish management responsibilities

##### Z.2: Ecological Reserves

- Determine boundaries on-site
- Place buoys along zone boundaries
- Establish management responsibilities

##### Z.3: Sanctuary Preservation Areas

- Prioritize zone marking
- Determine boundaries on-site
- Place buoys along zone boundaries
- Establish management responsibilities

##### Z.4: Existing Management Areas (Refer to Regulatory Action Plan)

##### Z.5: Special-use Areas

- Prioritize zone marking
- Determine boundaries on-site
- Place buoys along zone boundaries
- Determine high-impact or user-conflict activities
- Determine appropriate zones for high-impact activities or user conflicts
- Determine permitting process
- Establish management responsibilities

**Activity 1-Prioritize Zone Marking.** The boundaries of seven of the 27 areas will be identified and marked. Since not all zones can be marked concurrently, zone marking will be prioritized. The primary factors used to determine the order in which zones will be marked include season and proximity to human impacts. Boat-use survey data from the FDEP and The Nature Conservancy (TNC) will be used to determine use periods, and research requirements will also be considered.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FWS, FDEP, National Audubon Society, and TNC will be consulted regarding species activities. The FDEP and TNC will be consulted for boat-use survey data.

■ **Schedule.** This activity will be completed in year 1.

**Activity 2-Determine Boundaries On-site.** Accurate readings (NOAA and FWS sites) will be developed using aerial photography, global positioning system (GPS) receivers, and groundtruthing. Temporary markers will be placed at each corner of the sites to be identified and marked.

■ **Existing Program Implementation.** NOAA and the Sanctuary Advisory Council have preliminary boundaries for five of the seven zones (excluding Pelican Shoal and Crocodile Lake) on nautical charts.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The National Audubon Society and the Florida Game and

### Wildlife Management Areas

1. Sawyer Keys - Tidal creeks closed on south side.
2. East Harbor Key - No-access buffer zone (300 feet) around northernmost island.
3. Little Mullet Key - No-access buffer zone (300 feet) around island.
4. Upper Harbor Key - No-access buffer zone (300 feet) around island.
5. Little Crane Key - No-access buffer zone (300 feet) around island.
6. Boca Grande Key - South half of the beach closed.
7. Woman Key - Half of the beach and sand spit (southeast side) closed.
8. Horseshoe Key - No access buffer zone around main island.
9. Cottrell Key - No-motor zone (300 feet) around island.
10. Marquesas Keys -
  - a. No-motor zones (300 feet) around three smallest islands;
  - b. No-access buffer zone (300 feet) around one mangrove island;
  - c. Idle speed only/no wake zone through one tidal creek.
11. Snipe Keys - Idle speed only/no wake zone in main creek. No-motor zone elsewhere.
12. Mud Keys - Idle speed only/no wake zone in two main creeks; two smaller creeks closed.
13. Big Mullet Key - No-motor zone (300 feet) around island.
14. Tidal Flat South of Marvin Key - No-access buffer zone.
15. West Content Keys - Idle speed only/no wake zone in selected tidal creeks and one no-access buffer zone.
16. East Content Keys - Idle speed only/no wake zones in tidal creeks.
17. Bay Keys - Idle speed only/no wake zone in tidal creeks and no-motor zone (300 feet) around one island.
18. Lower Harbor Keys - Idle speed only/no wake zone in selected tidal creeks.
19. Cayo Agua Keys - Idle speed only/no wake zone in tidal creeks.
20. Pelican Shoal - No-landing and no-access zone out to 50 meters from shore between April 1 and August 31.
21. Crocodile Lake - No-access buffer zone (100 feet) along shoreline between March 1 and October 1.
22. Rodriguez Key - No-motor zone on tidal flat.
23. Tavernier Key - No-motor zone on tidal flat.
24. Snake Creek - No-motor zone on tidal flat.
25. Cotton Key - No-motor zone on tidal flat.
26. Dove Key - No-motor zone on tidal flat, area closed around two small islands.
27. Eastern Lake Surprise - Idle speed only/no wake zone east of US 1.

Note: Areas in bold italics will be marked and managed by NOAA, the FDEP, and Monroe County. Crocodile Lake will be marked by NOAA and managed, along with the remaining sites, by the FWS.

Freshwater Fish Commission (FGFWFC) staff will provide secondary implementation support

■ **Schedule.** This activity will be completed in year 1.

**Activity 3-Place Buoys/Signs Along Zone Boundaries.** Boundary buoys and/or signs will be placed along the boundaries of each zone, based on Federal and State guidelines, and will show the restricted action for each site. The type of buoy or sign used will be determined by the substrate. The physical placement of the buoys/signs will require developing an agreement with the FDEP.

■ **Existing Program Implementation.** The FWS is currently locating signs and/or buoys at the 19 sites for which it will have primary responsibility.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FWS, FDEP, FGFWFC, and U.S. Coast Guard (USCG) will assist in implementation.

■ **Schedule.** This activity will be completed in year 1.

**Activity 4-Establish Management Responsibilities.** NOAA, the FGFWFC, the FDEP, and Monroe County will manage seven of the 27 sites. The remaining 20 sites (including Crocodile Lake) will be managed by the FWS. All the areas will be managed to protect sensitive wildlife populations and habitats.

■ **Implementation.** NOAA, the FGFWFC, the FDEP, and Monroe County will have the lead responsibility for managing the seven sites not within the FWS program. Although the FWS will be responsible for managing and marking all other sites, NOAA will be responsible for marking the Crocodile Lake site.

■ **Schedule.** This activity will be continuous.

**The regulations for Wildlife Management Areas are included in the Regulatory Action Plan.**

### Strategy Z.2: Ecological Reserves

Ecological Reserves are Sanctuary zones that encompass areas of contiguous, diverse habitats, within which uses are subject to conditions and prohibitions, including public use restrictions. These areas are designed to minimize human influences, to provide natural spawning, nursery, and permanent



residence areas for the replenishment and genetic protection of marine life, and also to protect and preserve natural assemblages of habitats and species within areas representing the full range of diversity of resources and habitats found throughout the Sanctuary.

*(Priority Level High, High Level of Action in Year 1, 12+ Months to Complete)*

This Final Plan establishes one Ecological Reserve in the Western Sambos. It also commits NOAA to determining the boundaries and identifying the effective date for final regulations of a second Ecological Reserve in the Dry Tortugas within two years.

In the DMP/EIS, NOAA proposed boundaries for a Replenishment Reserve (Ecological Reserve) in the Dry Tortugas based on distribution of significant resources with an attempt to minimize or avoid impacts to users. Public comment identified serious adverse economic impact which would result from implementation of the no-take regulations within the proposed boundary. Consequently, NOAA did not establish final boundaries for the Dry Tortugas Replenishment Reserve (Ecological Reserve) in the final management plan and regulations. However, NOAA is committed to finalizing the Ecological Reserve at the Dry Tortugas. NOAA intends to undertake a process to determine the final boundary for the Dry Tortugas Ecological Reserve in coordination with the National Park Service and recommends the inclusion of portions of the Dry Tortugas National Park. To identify the final boundary, NOAA and the National Park Service will use the information gathered as part of the public review of the draft management plan and hold workshops with users, agency representatives, environmental organizations, and the public. Prior to making a final decision, NOAA and the National Park Service will publish the final boundary for public comment.

**Activity 1-Determine Boundaries On-site.** Accurate boundary readings will be developed using aerial photography, GPS receivers, and groundtruthing. Temporary markers will be placed along the boundaries of the reserve.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 6+ months to complete.

**Activity 2-Place Buoys Along Zone Boundaries.** Boundary buoy placement will be based on Federal

and State guidelines. Buoys will be placed in one-mile increments along zone boundaries, and will be visible for one mile. The type of anchor device used will be determined by the substrate where the buoy is placed.

■ **Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and USCG will provide secondary implementation assistance. The USCG must approve all buoys.

■ **Schedule.** This activity will have a high level of action in year 1. It will require 6+ months to complete.

**Activity 3-Establish Management Responsibilities.** The Sanctuary Superintendent will oversee all aspects of zone management, and will be responsible for ensuring that the first two activities (determining zone boundaries and placing buoys) are implemented. NOAA will establish a process for selecting the boundary of the Dry Tortugas Ecological Reserve. Sanctuary Managers will ensure that the public is educated about the zones and their restrictions, that all research and monitoring efforts are consistent with the goals of the Sanctuary, and that all regulations related to the zones are enforced. The Superintendent will coordinate with the FDEP, FMFC, and Monroe County in managing the zones.

■ **Implementation.** NOAA, the FMFC, the FDEP, and Monroe County will have the lead responsibility for managing the Replenishment Reserves.

■ **Schedule.** This activity will have a high level of action in year 1. It will be continuous.

**The research and monitoring components of this strategy are described in the Research and Monitoring Action Plan. The regulations for Ecological Reserves are included in the Regulatory Action Plan.**

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### Strategy Z.3: Sanctuary Preservation Areas

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Sanctuary Preservation Areas are Sanctuary zones that encompass discrete, biologically important areas, within which uses are subject to conditions and prohibitions, including public use restrictions, to avoid concentrations of uses that could result in significant declines in species populations or habitat, to reduce conflicts between uses, to protect areas that are critical for sustaining important marine

species and habitats, or provide opportunities for scientific research.

*(Priority Level High, High Level of Action in Year 1, 18+ Months to Complete)*

This strategy establishes 18 Sanctuary Preservation Areas (SPAs), totalling approximately 1,651ha. The largest will be the Carysfort/South Carysfort Reef, and the smallest will be Dry Rocks and Cheeca Rocks. The proposed Western Sambos SPA was eliminated from the Final Plan with the establishment of the Western Sambos Ecological Reserve which encompasses a cross-section of the coral reef community, ranging from the nearshore hardbottoms, seagrass communities, patch reefs, mid-channel reef, offshore patch reefs, and the fore reef habitat at Western Sambos Reef.

NOAA has allowed catch and release fishing by trolling in four SPAs: Conch Reef; Alligator Reef; Sombrero Key; and Sand Key. This action will allow the activity of catch and release fishing to be compared with other SPAs where it is not allowed. In addition, the taking of ballyho for bait by net will be allowed by permit in all SPAs.

**Activity 1-Prioritize Zone Marking.** The boundaries for all zones will be identified and marked. Since not all zones can be marked concurrently, marking must be prioritized. The primary factors that will be used to

determine the order in which zones will be marked include the level of current use, season, and relative threats to resources (e.g., vessel groundings). Boat-use survey data from the FDEP and TNC aerial census will be used to determine use periods, and the availability of existing monitoring data will also be considered.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity.

■**Schedule.** This activity will have a high level of action in year 1. It will require 6+ months to complete.

**Activity 2-Determine Boundaries On-site.** Accurate boundary readings of all sites will be determined using aerial photography, GPS receivers, and groundtruthing. Temporary markers will be placed at the corner of each zone.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity.

■**Schedule.** This activity will have a high level of action in year 1. It will require 6+ months to complete.

**Activity 3-Place Buoys Along Zone Boundaries.** Boundary buoys will be placed at the corner of each zone based on Federal and State guidelines, with the type of anchoring device determined by the substrate where the buoy is placed. The buoys will be visible for a half-mile.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and USCG will assist in implementing this activity.

■**Schedule.** This activity will have a high level of action in year 1. It will require 9 months to complete.

**Activity 4-Establish Management Responsibilities.** The Sanctuary Superintendent will oversee all aspects of zone management, and will be responsible for ensuring that the first three activities (prioritizing zone marking, determining boundaries, and placing buoys) are implemented. Sanctuary Managers will ensure that the public is educated about the zones and their restrictions, that all research and monitoring efforts are consistent with the goals of the Sanctuary, and that all related regulations are enforced. The Superintendent will coordinate with the FDEP, the FMFC, and Monroe County in managing the zones and will work with the Mooring Buoy working group to install mooring buoys in these areas.

Sanctuary Preservation Areas	
Zone	Approximate Area (ha)
Alligator Reef	60
Carysfort/South Carysfort Reef	515
Cheeca Rocks	16
Coffins Patch	147
Conch Reef	23
Davis Reef	58
Dry Rocks	16
Eastern Dry Rocks	27
French Reef	37
Grecian Rocks	107
Hen and Chickens	60
Loce Key	115
Molasses Reef	89
Newfound Harbor Key	43
Rock Key	25
Sand Key	151
Sombrero Key	73
The Elbow	90
<b>Approximate Total</b>	<b>1,651</b>

■ **Implementation** NOAA, the FMFC, the FDEP, and Monroe County will have the lead responsibility for managing the zones

■ **Schedule** This activity will have a medium level of action in year 1. It will be continuous

**The research and monitoring components of this strategy are described in the Research and Monitoring Action Plan. The regulations for Sanctuary Preservation Areas are included in the Regulatory Action Plan.**

### Strategy Z.4: Existing Management Areas

Existing Management Areas are resource management areas currently managed by other agencies and where regulations already exist. Proposed Sanctuary regulations will supplement these authorities for comprehensive protection of resources. Any additional management measures that may be developed and implemented will be in coordination with the agency having jurisdictional authority.  
(Completed in Year 1)

There are currently 21 Existing Management Areas within the Sanctuary. Fifteen are administered by the FDEP, four by the FWS, and two by NOAA.

### Strategy Z.5: Special-use Areas

This strategy establishes zones to set aside areas for scientific research and educational purposes, restoration, monitoring, or to establish areas that confine or restrict activities such as personal watercraft

#### Special-use Areas

Zone	Area (ha)
Conch Reef	72
Looe Key (Patch Reef)	34
Eastern Sambos	63
Tennessee Reef	53
<b>Total</b>	<b>222</b>

Note: These four zones are for research only

#### Existing Management Areas

##### Federal

National Oceanic and Atmospheric Administration  
Key Largo National Marine Sanctuary  
Looe Key National Marine Sanctuary  
U.S. Fish and Wildlife Service  
Crocodile Lake National Wildlife Refuge  
Great White Heron National Wildlife Refuge  
Key West National Wildlife Refuge  
National Key Deer Refuge

##### State

Department of Environmental Protection  
Division of Recreation and Parks  
Bahia Honda State Park  
Curry Hammock (undesignated)  
Fort Zachary Taylor State Historic Site  
Indian Key State Historic Site  
John Pennkamp Coral Reef State Park  
Key Largo Hammocks State Botanical Site  
Lignumvitae Key State Botanical Site  
(includes Shell Key State Preserve)  
Long Key State Recreation Area  
San Pedro State Underwater Archaeological Site  
Windley Key State Geological Site  
Division of Marine Resources  
Biscayne Bay and Card Sound Aquatic Preserve  
Coupon Bight Aquatic Preserve  
Lignumvitae/Indian Key Aquatic Preserve

operations and live-aboard mooring fields. These areas will minimize impacts on sensitive habitats and reduce user conflicts. Special management programs (e.g., monitoring, research, special-use permits and restoration) can be conducted without impediment to these areas. They can be used to set aside areas for specific uses such as long-term research and monitoring and/or minimizing the adverse environmental effects of high-impact activities.  
(Priority Level Medium, Medium Level of Action in Year 1, 12+ Months to Complete, <50% Funding Available for Full Implementation)

This strategy initially establishes four zones designated for scientific research and monitoring. Those designated are Conch and Tennessee reefs in the Upper and Middle Keys, and Looe Key and Eastern Sambos in the Lower Keys.

The Eastern Sambos Research Only area replaces Pelican Shoals in the draft plan as a Research Only area. The Eastern Sambos was selected in order to provide a better research and monitoring site, while

simultaneously lessening the public impact of limiting access to the reef around Pelican Shoals.

**Activity 1-Prioritize Zone Marking.** The boundaries of the four research-only zones will be identified and marked. Since not all zones can be marked concurrently, marking will be prioritized. The primary factors that will be used to determine the order in which the zones will be marked will include the level of current use, season, and relative threats to resources (e.g., vessel groundings). Boat-use survey data from the FDEP and TNC will be used to determine use periods, and the availability of existing monitoring data will also be considered.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 6+ months to complete.

**Activity 2-Determine Boundaries On-site.** Accurate boundary readings of all sites will be determined using aerial photography, GPS receivers, and groundtruthing. Temporary markers will be placed at the corner of each zone.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity.

■**Schedule.** This activity will have a low level of action in year 1. It will require 6+ months to complete.

**Activity 3-Place Buoys Along Zone Boundaries.** Boundary buoys will be placed at the corner of each zone based on Federal and State guidelines, with the type of anchoring device determined by the substrate where the buoy is placed. The buoys will be visible for a half-mile.

■**Implementation.** NOAA will be the lead agency responsible for implementing this activity. The FDEP and USCG will assist in implementation.

■**Schedule.** This activity will have a medium level of action in year 1. It will require 9 months to complete.

**Activity 4-Determine High-Impact Activities or User-Conflicts.** This activity will determine which activities will have a high impact on Sanctuary resources. It will also identify those activities that result in major user conflicts. Zones may be developed for these activities if appropriate.

■**Implementation.** NOAA, the FDEP, and Monroe County will be jointly responsible for implementing this activity.

■**Schedule.** This activity will have a low level of action in year 1. It will require 12 months to complete.

**Activity 5-Determine Appropriate Zones for High Impact or User-Conflict Activities.** Based on the information developed in activity 4, management zones may be developed for high-impact and user-conflict activities.

■**Implementation.** NOAA, the FDEP, and Monroe County will be jointly responsible for implementing this activity.

■**Schedule.** No action is planned for year 1. It will require 12 months to complete.

**Activity 6-Determine Permitting Process.** The process for issuing permits for Special-use Areas will be determined, and the procedures for reviewing and approving permit applications will be defined.

■**Implementation.** NOAA, the FDEP, and Monroe County will be jointly responsible for implementing this activity.

■**Schedule.** No action is planned for year 1. It will require 12 months to complete.

**Activity 7-Establish Management Responsibilities.** The Sanctuary Superintendent will oversee all aspects of zone management, and will be responsible for ensuring that activities 1 to 6 are implemented. Sanctuary Managers will ensure that the public is educated about the zones and their restrictions, that all research and monitoring efforts are consistent with the objectives of the strategy, and that all related regulations are enforced.

■**Implementation.** NOAA, the FDEP, and Monroe County will be jointly responsible for implementing this activity.

■**Schedule.** This activity will have a low level of action in year 1. It will be continuous.

**The regulations for Special-use Areas are included in the Regulatory Action Plan. A component of this strategy is also included in the Water Quality Action Plan.**

## Implementation

*This section explains how the strategies in the zoning plan will be implemented. The institutions responsible for each activity, and those agencies that will provide some assistance, are identified. Zoning strategies are also ranked to indicate their overall Sanctuary priority level. In addition, the planned level of activity in year 1, months to complete, funding availability, cost estimates, staff requirements, and geographic focus of each strategy and activity are provided.*

**Responsible Institutions.** The Zoning Plan will be implemented by the coordinated efforts of Federal, State, and local agencies in cooperation with non-profit institutions. NOAA has the lead responsibility for implementing the overall Program. The FDEP and the FMFC will provide primary support by managing several zones, and the FWS will be responsible for managing most Wildlife Management Areas. In addition, the FMFC, the USCG, Monroe County, and the National Audubon Society will help implement selected activities. Table 29 lists the participating institutions and their level of responsibility for implementing each activity.

**Prioritization of Implementation.** The Zoning Plan includes five strategies from Alternative III. The highest-ranking strategies are Ecological Reserves and Sanctuary Preservation Areas, which are included in the high priority level, based on their anticipated impact on Sanctuary resources. Wildlife Management Areas and Existing Management Areas are not included in a priority group, because they will be implemented completely or partially in year 1. The FWS has already established 20 Wildlife Management Areas in the Sanctuary. NOAA will be responsible for marking the remaining seven areas. The Special-use Area strategy is included in the high priority level.

**Schedule.** The Existing Management Areas and some Wildlife Management Areas strategies will be completed in year 1. The process of prioritizing and marking Sanctuary Preservation Areas and Ecological Reserves will begin in year 1, but marking will not be completed until after year 1. Zone management will be continuous, and an integral part of the Sanctuary management process. The Special-use Areas strategy will have only a medium level of action in year 1.

Table 29. Agencies/Organizations Identified for Implementing Strategies/Activities

Strategy/Activity	Agencies/Organizations					
	NOAA-Sanctuary	USFWS	USCG	FDEP/FMFC	Monroe County	FGFWFC
<b>Zoning</b>						
<b>Z.1 Wildlife Management Areas</b>						
Prioritize Zone Marking	●	○		○		○
Determine Boundaries On-site	●					○
Place Buoys/Signs Along Zone Boundaries	●	○	○	○	●	
Establish Management Responsibilities	●	●		●	●	●
<b>Z.2 Ecological Reserves</b>						
Determine Boundaries On-site	●			●		
Place Buoys Along Zone Boundaries	●		○	○		
Establish Management Responsibilities	●			●	●	
<b>Z.3 Sanctuary Preservation Areas</b>						
Prioritize Zone Marking	●					
Determine Boundaries On-site	●					
Place Buoys Along Zone Boundaries	●		○	○		
Establish Management Responsibilities	●			●	●	
<b>Z.4 Existing Management Areas</b> <i>Refer to Regulatory Action Plan</i>						
<b>Z.5 Special-Use Areas</b>						
Prioritize Zone Marking	●					
Determine Boundaries On-site	●					
Place Buoys Along Zone Boundaries	●		○	○		
Determine High-Impact Activities or User-Conflicts	●			●	●	
Determine Appropriate Zones for High-Impact or User-Conflict Activities	●			●	●	
Determine Permitting Process	●			○	○	
Establish Management Responsibilities	●			●	●	

● Lead    ● Primary Role    ○ Assist

Abbreviations: NOAA, National Oceanic and Atmospheric Administration; USFWS, U.S. Fish and Wildlife Service; USCG, U.S. Coast Guard; FDEP, Florida Department of Environmental Regulation; FGFWFC, Florida Game and Freshwater Fish Commission; The Nature Conservancy; Natl. Audubon, National Audubon Society.

**Cost.** The estimated cost of implementing each strategy is given in Table 30. Based on the large number of buoys to be installed, Sanctuary Preservation Areas is expected to be the most costly strategy (it is included in the \$10,000 to \$99,000 category for capital and annual operations and maintenance costs). Approximately 80 buoys will be required to completely mark these zones. Because of the size of the Ecological Reserves, marking these areas will also be expensive. Assuming one buoy is installed every mile, about 10 buoys will be placed in this zone. Approximately 24 signs/markers will be placed

Table 30. Requirements for Implementation

Strategy/Activity	Overall Sanctuary Priority Level *	Implementation			Cost to Complete		Geographic Focus	
		Planned Level of Action in Year 1	Months to Complete	Funding Available to Complete	Total Capital (\$1,000)	Annual Operations/Maintenance (\$1,000)	Geographic Focus	# of Personnel
ZONING								
Z.1 Wildlife Management Areas	*	High	12+	100%	10-99	10-99		6
Prioritize Zone Marking	High	High	3	100%	NC	<10	Z	
Determine Boundaries On-site	High	High	6	100%	<10	<10	Z	
Place Buoys/Signs Along Zone Boundaries	Medium	High	6	100%	10-99	<10	Z	
Establish Management Responsibilities	Low	High	C	100%	NC	10-99	Z	
Z.2 Ecological Reserves	High	High	12+	<50%	10-99	10-99		6
Determine Boundaries On-site	High	High	6+	<50%	<10	<10	Z	
Place Buoys Along Zone Boundaries	High	High	6+	<50%	10-99	<10	Z	
Establish Management Responsibilities	High	High	C	100%	NC	10-99	Z	
Z.3 Sanctuary Preservation Areas	High	High	18+	<50%	10-99	10-99		6
Prioritize Zone Marking	High	High	6+	100%	NC	<10	Z	
Determine Boundaries On-site	High	High	6+	<50%	<10	<10	Z	
Place Buoys Along Zone Boundaries	High	High	9	<50%	10-99	<10	Z	
Establish Management Responsibilities	Medium	Medium	C	100%	NC	10-99	Z	
Z.4 Existing Management Areas		Refer to Regulatory Action Plan						
Z.5 Special-Use Areas	Medium	Medium	12+	<50%	<10	10-99		6
Prioritize Zone Marking	High	Medium	6+	<50%	NC	<10	Z	
Determine Boundaries On-site	High	Medium	6+	<50%	NC	<10	Z	
Place Buoys Along Zone Boundaries	Medium	Medium	9	<50%	<10	<10	Z	
Determine High-Impact Activities or User-Conflicts	Low	Low	12	<50%	<10	<10	Z	
Determine Appropriate Zones for High-Impact or User-Conflict Activities	Low	None	12	<50%	NC	10-99	Z	
Determine Permitting Process	Low	None	12	<50%	NC	10-99	Z	
Establish Management Responsibilities	Low	Low	C	100%	NC	10-99	Z	

Abbreviations: C, Continuous; Z, Applies to Respective Zone.

\* Strategies with an "\*" for Overall Sanctuary Priority Level are already existing programs and will be completed in Year 1.

Note: The priority levels for activities should not be compared across strategies—they only represent the relative importance of activities contained within a strategy.

in the Wildlife Management Areas. Each of these strategies is included in the \$10,000 to \$99,000 range for capital and annual operations and maintenance costs. Because the Special-use Areas strategy will evolve over time, the full cost of implementation is uncertain.

**Geographic Focus.** The activities in strategies only apply to their respective zones. Sanctuary Preservation Areas, reflecting their purpose of protecting heavily used reefs, are distributed on the Atlantic side of the Keys. The Western Sambo's Ecological Reserve is located in the Lower Keys and a site will be in the Dry Tortugas. Wildlife Management Areas are concentrated in the backcountry, from Horseshoe

Key to the Bay Keys, with a few in the Upper Keys. Existing Management Areas are distributed throughout the Sanctuary.

**Staff.** Overall, the Sanctuary Superintendent (NOAA) will have the lead responsibility for implementing all zoning strategies. However, a staff biologist and another staff member will be directly responsible for identifying and marking the zones. In addition, implementation will require the participation of personnel from various agencies and organizations, and private vendors will be contracted to assist in identifying and marking the various zones.

**Contingency Plan for a Changing Budget.** The level of funding for the Sanctuary Preservation Areas, Ecological Reserves, and Special-use Areas strategies is insufficient to fully implement these activities in year 1. Consequently, marking may be delayed or modified until funds are available.

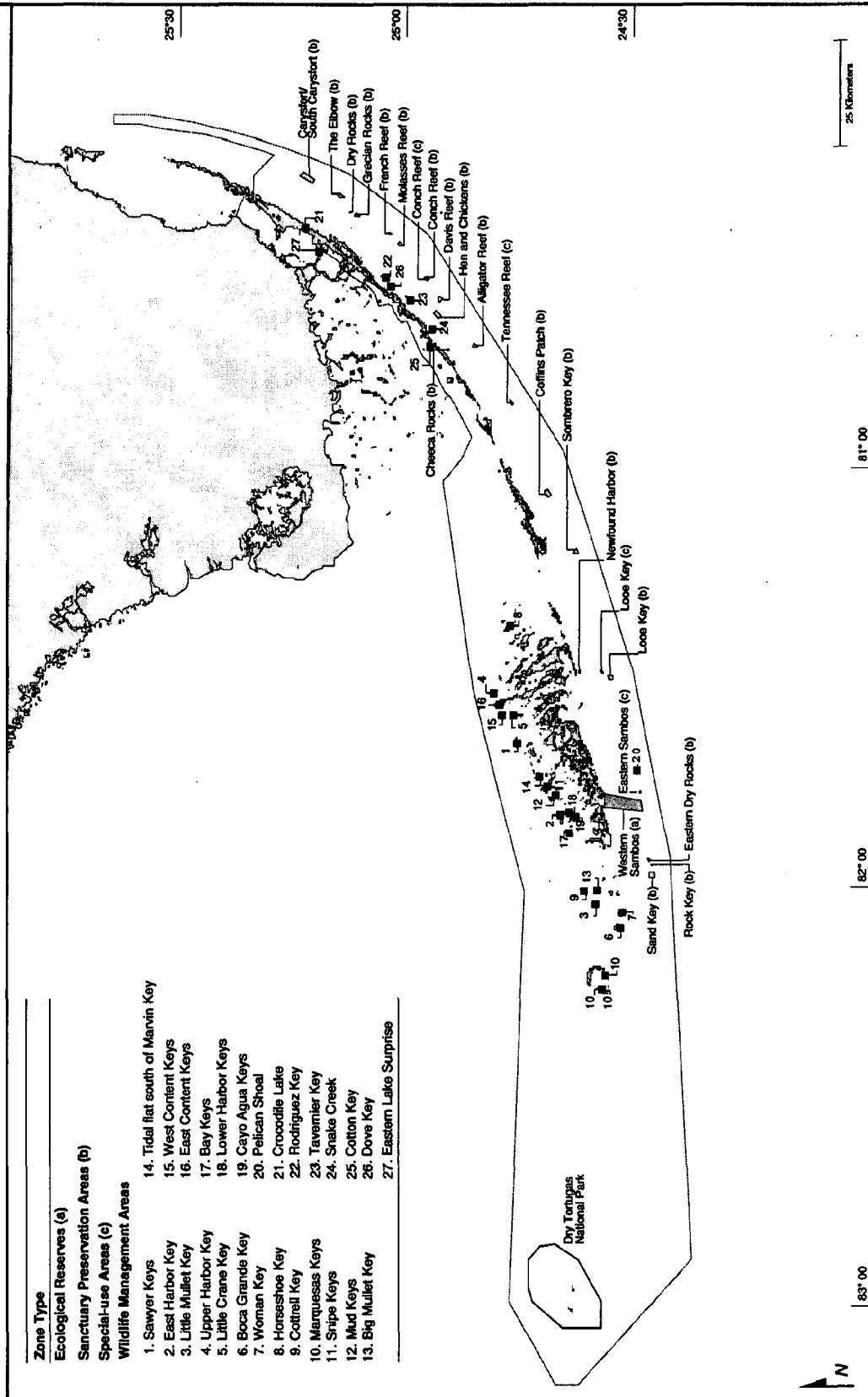
**Evaluating Program Effectiveness.** NOAA will evaluate the effectiveness of the Zoning Program in its five-year update of the Management Plan. For example, research and monitoring on Ecological Reserves will be used to determine the degree to which the zones enhance biological diversity and increase the productivity of important marine life species. In order to accomplish this evaluation, NOAA will establish an interdisciplinary team including managers, scientists, affected users, and environmentalists. Also, because the Reserves will be used as control areas to help understand the impacts of water quality, pollution, and various human uses, their value in this capacity will be evaluated as well. Based on the results of these studies, NOAA will consider expanding, modifying, or eliminating Reserves. The success of the other zones will be evaluated at this time as well.

## Zoning Maps

The maps in this section reflect the management zones for the Final management plan. The first map shows Ecological Reserves, Sanctuary Preservation Areas, Special-use Areas, and Wildlife Management Areas. Next, Existing Management Areas are shown on a single map. Following this are maps for each of the Ecological Reserves, Sanctuary Preservation Areas, and Special-use Areas. Finally, Wildlife Management Areas are mapped either individually or in groups, whichever best portrays the areas.

# Final Zoning Plan

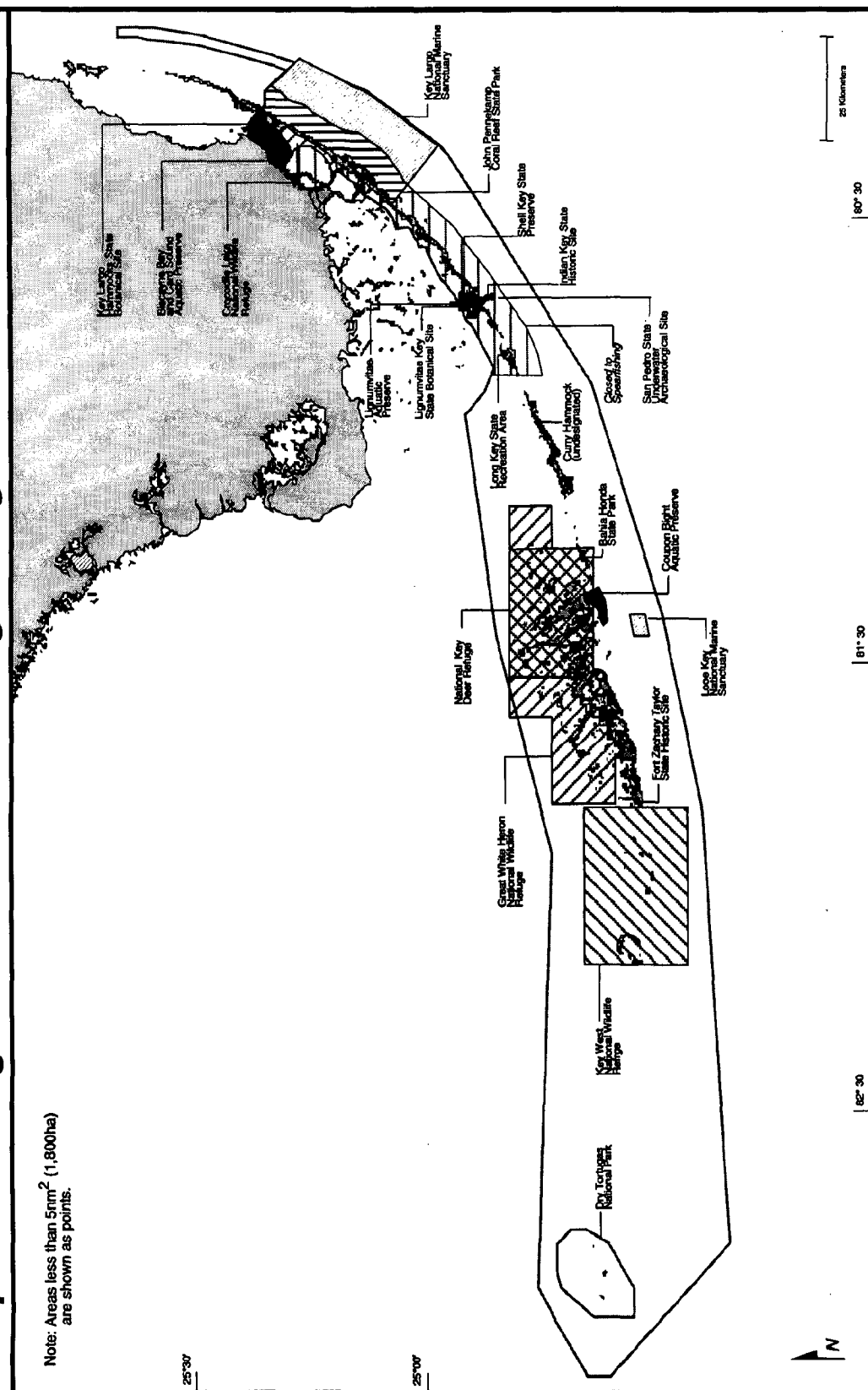
Zone Type	
Ecological Reserves (a)	
Sanctuary Preservation Areas (b)	
Special-use Areas (c)	
Wildlife Management Areas	
1. Sawyer Keys	14. Tidal flat south of Marvin Key
2. East Harbor Key	15. West Content Keys
3. Little Mullet Key	16. East Content Keys
4. Upper Harbor Key	17. Bay Keys
5. Little Crane Key	18. Lower Harbor Keys
6. Boca Grande Key	19. Cayo Agua Keys
7. Woman Key	20. Pelican Shoal
8. Horseshoe Key	21. Crocodile Lake
9. Cottrell Key	22. Rodriguez Key
10. Marquesas Keys	23. Tavernier Key
11. Snipe Keys	24. Snake Creek
12. Mud Keys	25. Cotton Key
13. Big Mullet Key	26. Dove Key
	27. Eastern Lake Surprise



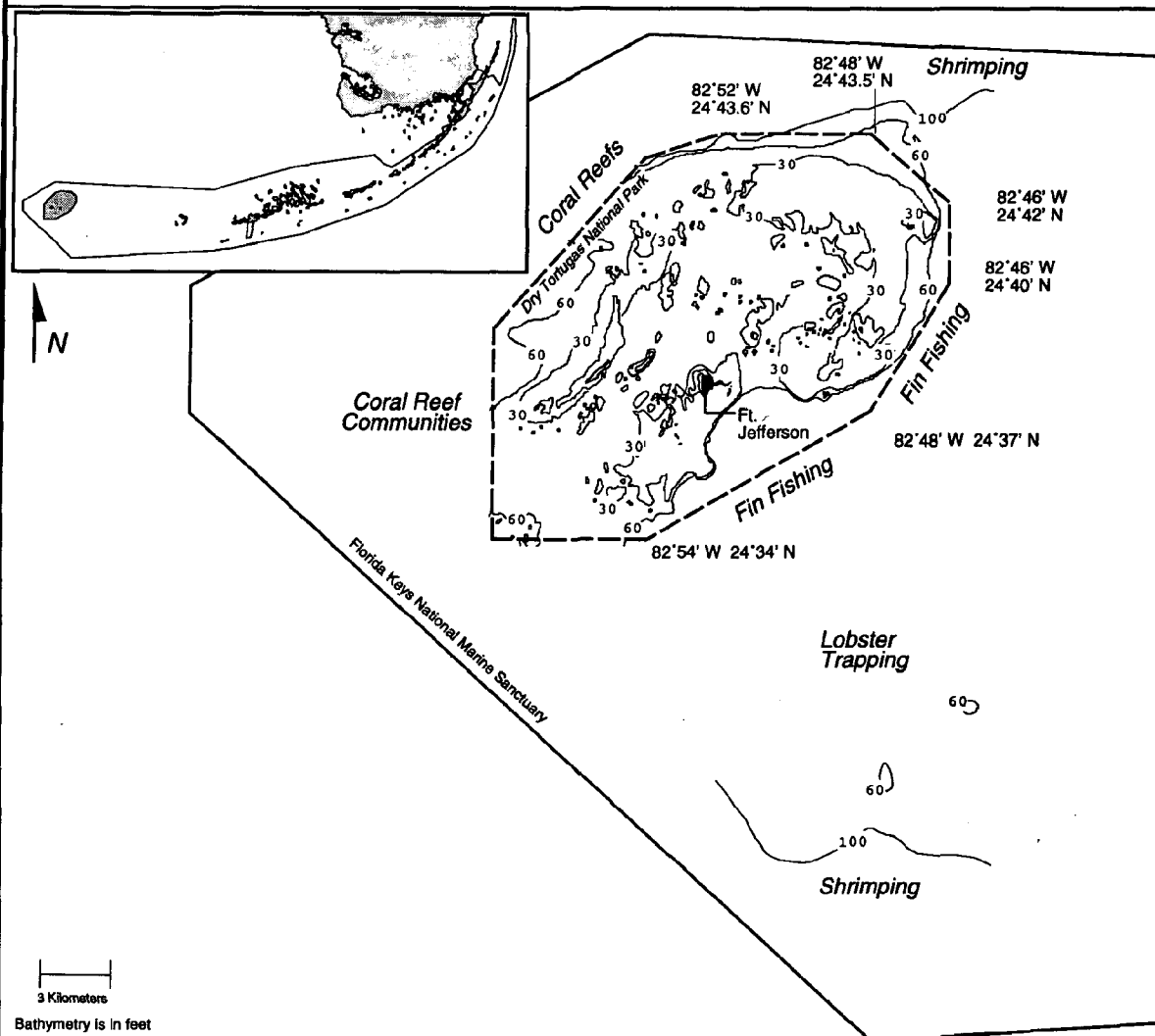


### **Proposed Zoning Alternative III: Existing Management Areas**

**Note:** Areas less than  $5\text{nm}^2$  (1,800ha) are shown as points.



## Dry Tortugas Ecological Reserve Study Area

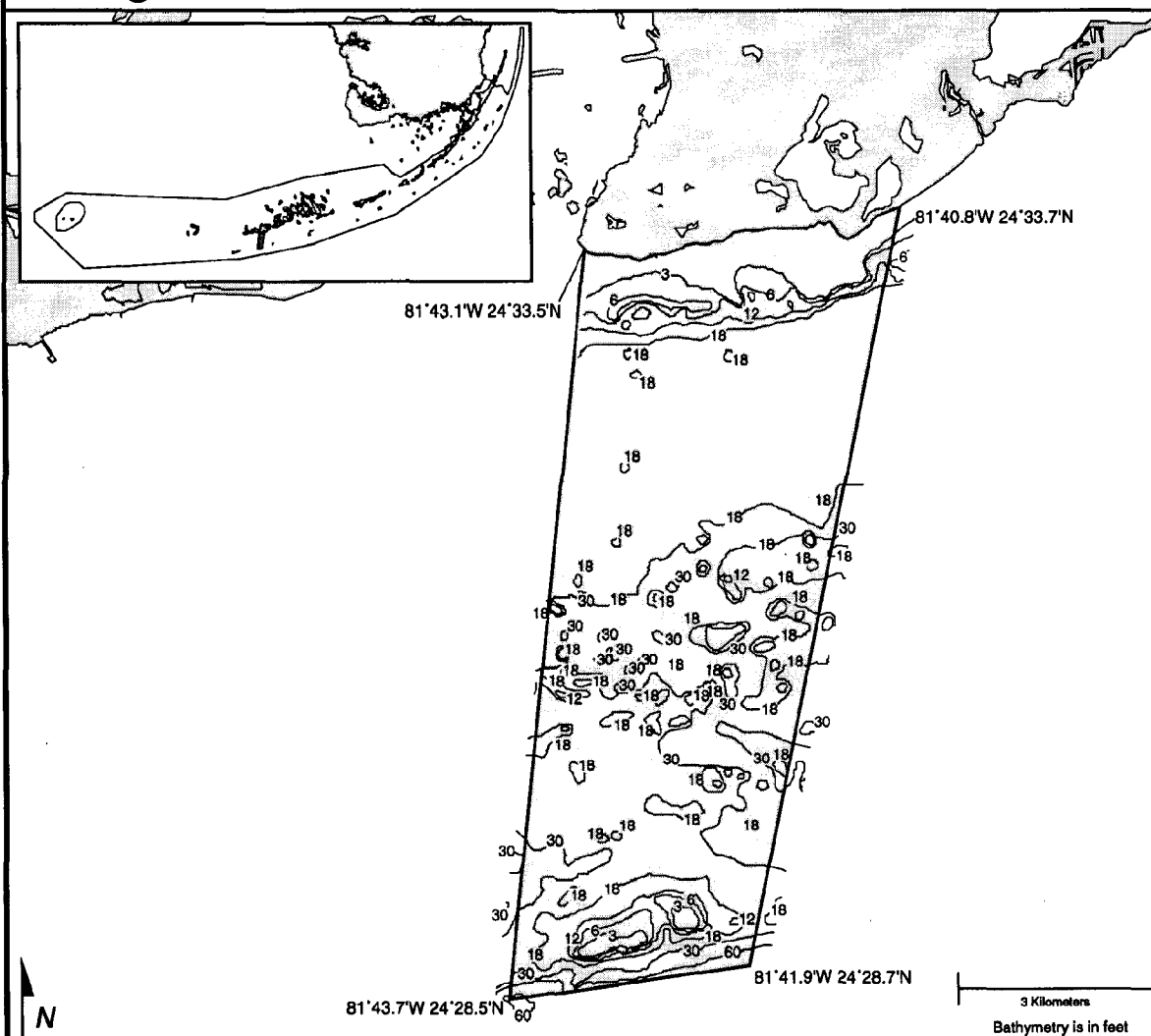


## Description

The Dry Tortugas banks are located at the westernmost extent of the Keys. The area contains diverse habitats, including seagrass beds, coral reef habitats, (e.g., patch reefs, fore reefs, intermediate and deep reefs), and hardbottom areas.

NOAA did not finalize the establishment of the Dry Tortugas ER in the management plan and regulations. Rather, NOAA will postpone final establishment of the boundary of the Dry Tortugas ER until it undertakes a process, in coordination with the National Park Service to identify an appropriate final boundary for the Reserve. To identify the final boundary, NOAA and the National Park Service will use the information gathered as part of the public review of the draft management plan, and hold workshops with users, agency representatives, environmental organizations and the public. Prior to making a final decision, the proposed final boundary of the Dry Tortugas ER will be published for public comment.

## Ecological Reserve: Western Sambos



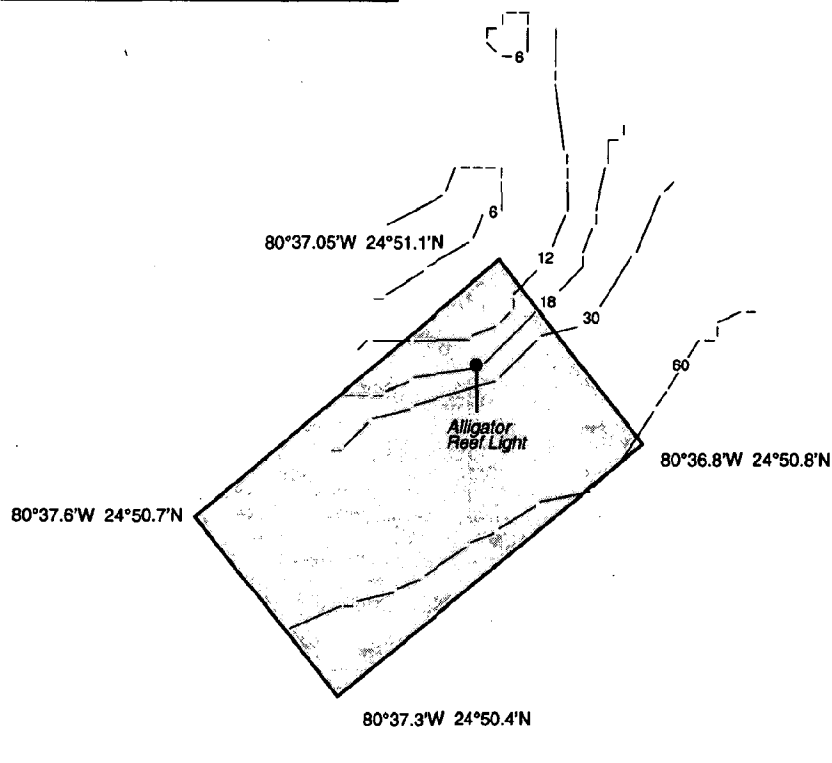
## Description

The Western Sambos Ecological Reserve contains the greatest habitat diversity in the Lower Keys. Significant coral features include spur-and-groove formations, bank reefs, and nearshore patch reefs.

This reserve is rectangular, extending from the northern limit at the U.S. Naval Air Station property on Boca Chica seaward to the southern limit at the 60-foot depth contour. At the air station, the Ecological Reserve is approximately 2nm (4km) wide; at the southern edge it is approximately 1.5nm (2.8 km) wide. The area covered totals approximately 9nm<sup>2</sup>, or about 3,000ha.

Some current users, including lobster fishermen, tropical marine-life collectors, and recreational and commercial fishermen, will be displaced to other areas. Some spearfishing activities will also be displaced. Areas outside the Ecological Reserve will be impacted some by the increased pressure from the displaced users.

## Sanctuary Preservation Area: Alligator Reef



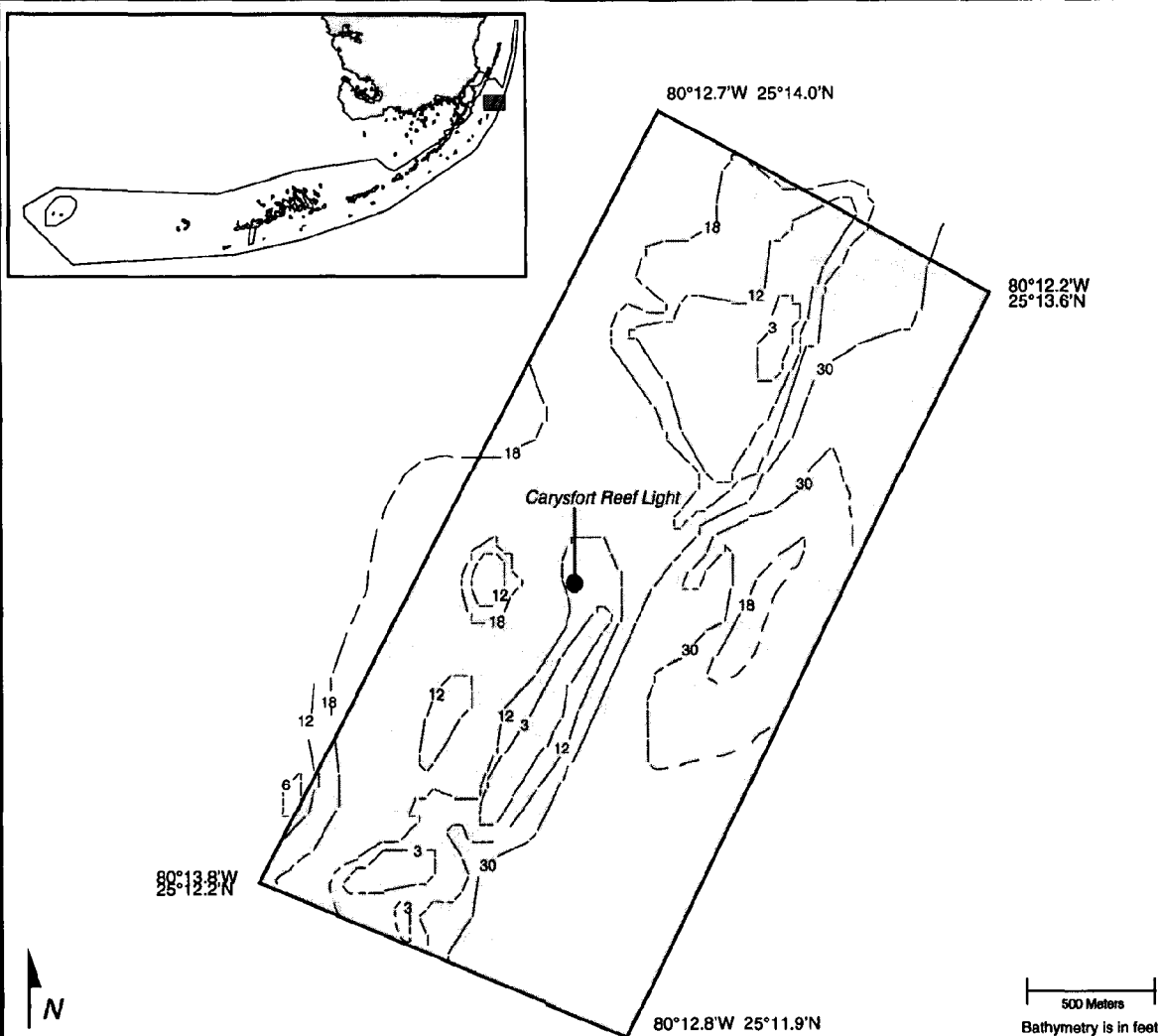
### Description

Alligator Reef is a small bank reef with some transitional reef features. It is located between the shallow reefs of the Upper Keys and the deeper, drowned reefs of the Middle Keys, and lies approximately 3.5 nautical miles (7km) southeast of Upper Matecumbe Key.

The Alligator Reef Sanctuary Preservation Area (SPA) encompasses approximately 0.2nm<sup>2</sup>, or about 60ha. It protects the drowned spur-and-groove system, reef crest, and a portion of the northeast rubble ridge.

Alligator Reef is easily accessible and mooring buoys are currently in place. The reef is heavily used for a variety of recreational and commercial purposes. Diving and snorkeling activities focus on the spur-and-groove system and reef crest. Commercial activities occur in the rubble areas and surrounding flats and include tropical fish collecting and ballyhoo fishing. The boundary separates these activities with minimal displacement of any user group. However, catch and release fishing by trolling is allowed in this SPA. Because of easy accessibility and heavy use, the area has poor research potential, except for comparison with other reefs.

## Sanctuary Preservation Area: Carysfort/South Carysfort Reef



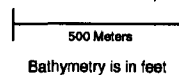
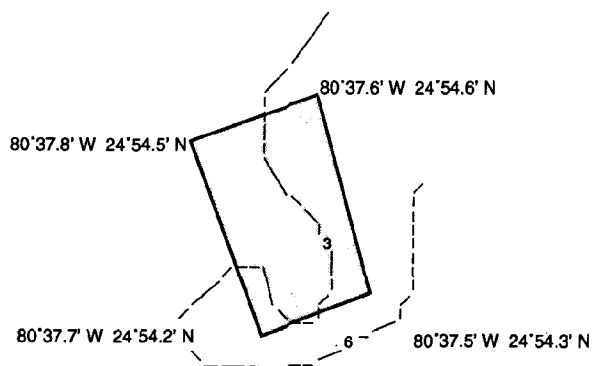
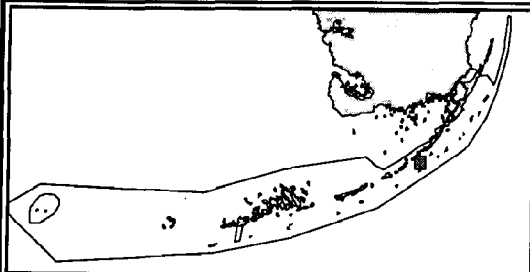
### Description

Carysfort Reef is one of the best developed reef systems in the Keys, and contains a wide variety of reef features including well-developed stands of elkhorn coral. Reef development is enhanced by the water quality, temperature, and salinities of the Gulf Stream, which sweeps close to the seaward edge of the reef. The historic Carysfort lighthouse is located near the center of this Sanctuary Preservation Area (SPA), which is approximately 5.6nm (10.5km) off the coast of Key Largo.

Carysfort/South Carysfort Reef is the largest of the SPAs, and encompasses approximately 1.5nm<sup>2</sup>, or about 515ha. It is rectangular, and extends seaward of the main reef to the first trough. The SPA protects the rubble area behind the main reef, as well as some adjacent patch reefs.

Carysfort/South Carysfort Reef is accessible from the Ocean Reef community and from Card Sound through Angelfish Creek. Commercial diving and recreational fishing occur in the area, but there appears to be little conflict among users. Some lobster fishermen will be displaced to the surrounding areas. The Carysfort/South Carysfort Reef SPA has high research potential and is a good candidate for use as a control area.

## Sanctuary Preservation Area: Cheeca Rocks

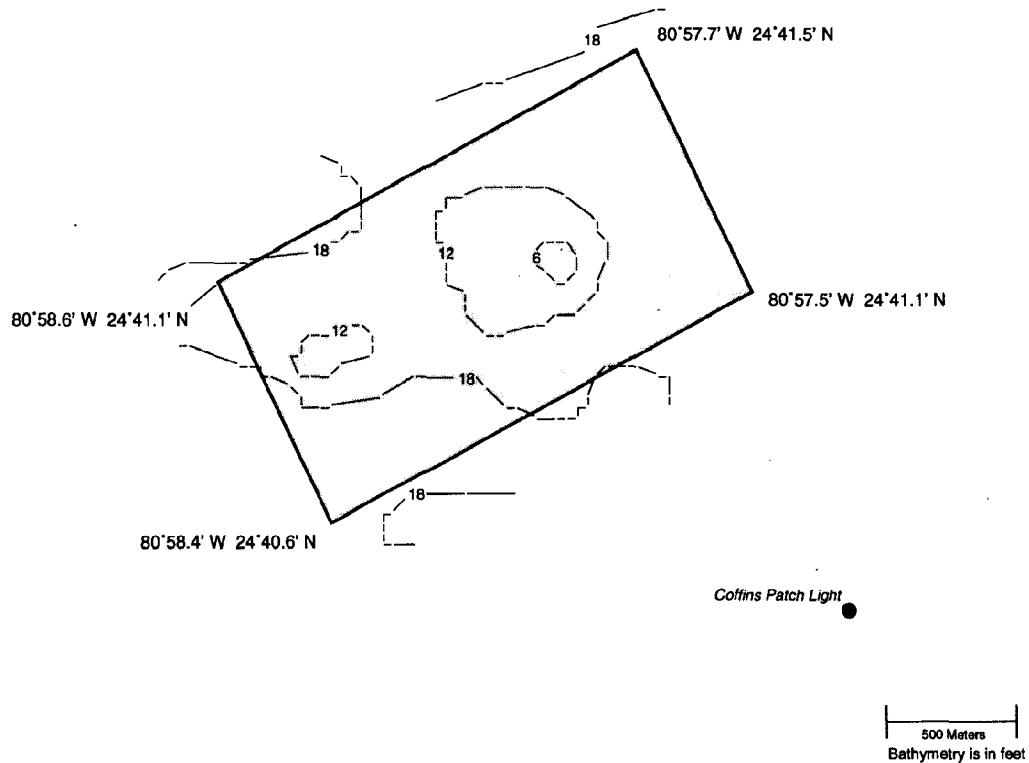


### Description

The Cheeca Rocks Sanctuary Preservation Area (SPA) is the only area in the Middle Keys designated to protect inshore patch reefs. Cheeca Rocks is one of the smallest SPAs, encompassing approximately 0.05nm<sup>2</sup>, or about 16ha. The area is approximately 0.5nm (1km) southeast of Upper Matecumbe Key.

Cheeca Rocks is easily accessible. The reefs are heavily used, especially by visitors to Cheeca Lodge. Primary uses include diving, snorkeling, and education activities. A few local tropical fish collectors use the area and will be displaced by the SPA, but there are no major consumptive users. The potential for research is poor due to heavy use.

## Sanctuary Preservation Area: Coffins Patch



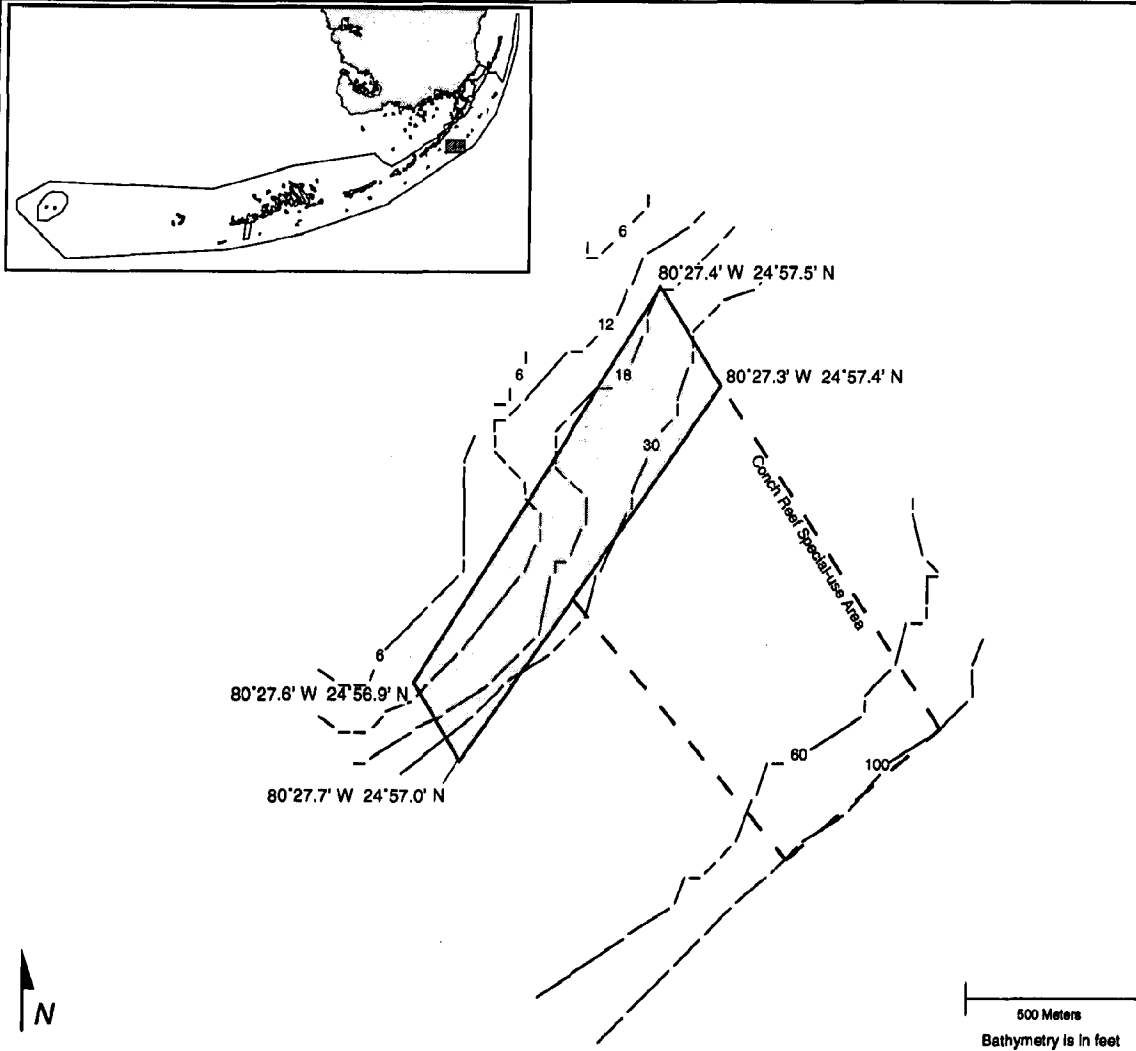
### Description

Although Coffins Patch is fairly close to shore, it has the characteristics of an offshore patch reef system. The reef includes rare pillar coral and other coral species unique to the Keys. The Sanctuary Preservation Area (SPA) is approximately 4nm (7km) southeast of Key Colony Beach.

The SPA is rectangular and covers an area of approximately 0.4nm<sup>2</sup>, or about 147ha. It includes the entire patch reef and some of the rubble field behind the main reef. Other inshore and offshore patch reefs in the surrounding area remain open.

The area is easily accessible, but no mooring buoys are currently in place. This is a low-use area visited by divers, recreational fishermen, treasure hunters, and souvenir collectors. Some tropical fish collecting occurs within and around the reef. Little, if any, displacement of users will occur since other patch reefs in the area will remain open for use.

## Sanctuary Preservation Area: Conch Reef



## Description

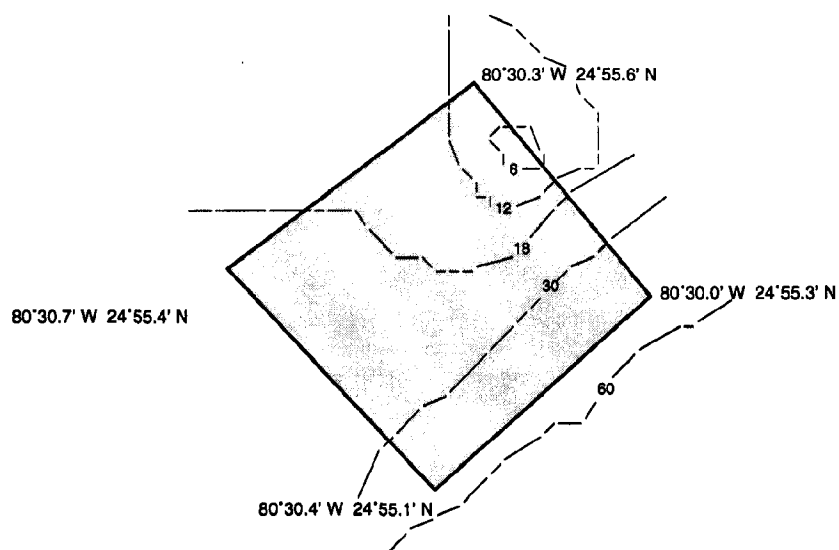
Conch Reef has one of the best developed reef wall systems in the Keys. It has good conch habitat and contains well-developed stands of rare pillar coral. The Sanctuary Preservation Area (SPA) is located approximately 5nm (9km) south of Tavernier Key.

The SPA is rectangular and covers an area of approximately 0.07nm<sup>2</sup>, or about 23ha. It runs from the landward boundary to an approximate depth of 45 feet, and includes some of the reef wall. Catch and release fishing by trolling will be allowed in this SPA. The SPA is adjacent to a Special-use Area designated as "Research Only."

Conch Reef is easily accessible from Key Largo and is heavily used by divers, with some tropical fish collecting in the rubble zone. There is little user conflict because lobster fishermen operate away from the area of heavy diving activity. Recreational fishermen troll the reef wall in 160 to 180 feet of water.



## Sanctuary Preservation Area: Davis Reef



500 Meters  
Bathymetry is in feet

### Description

Davis Reef is a good example of a low-relief transitional reef containing well-developed gorgonian coral. The Sanctuary Preservation Area (SPA) is located approximately 4nm (7km) southeast of Plantation Key.

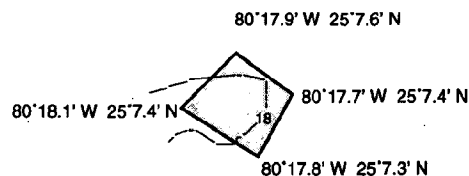
The SPA is a small, rectangular area covering approximately 0.2nm<sup>2</sup>, or about 58 ha. Its presence will help protect the area's unique deepwater corals.

Davis Reef is easily accessible and heavily used. The area attracts a considerable number of divers from Islamorada, and is also used by recreational fishermen. There is some tropical fish collecting in the rubble areas, and commercial fishing is conducted offshore. There will be little displacement of current users. Because the area is heavily used, it has poor potential for research activities.

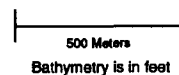
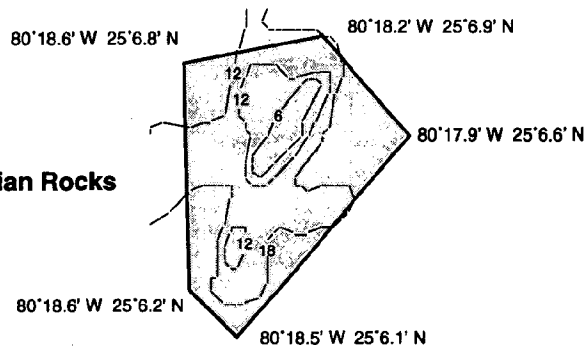
## Sanctuary Preservation Area: Dry Rocks, Grecian Rocks



### Dry Rocks



### Grecian Rocks



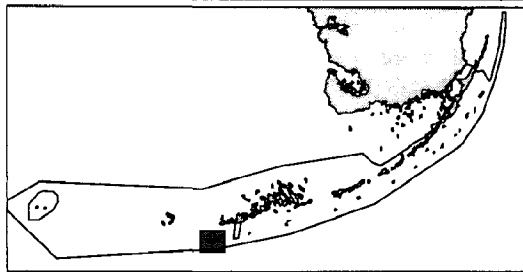
## Description

Dry Rocks and Grecian Rocks lie within the boundaries of the Key Largo National Marine Sanctuary. They both contain good stands of elkhorn coral, and Dry Rocks contains the statue "Christ of the Deep." The two Sanctuary Preservation Areas (SPAs) are ringed with mooring buoys.

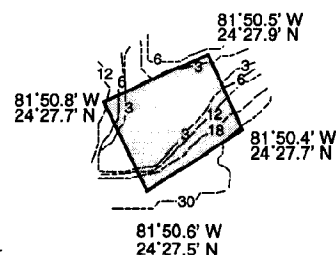
Both SPAs are located seaward of White Banks and extend to an approximate depth of 30 feet. Dry Rocks SPA covers an area of approximately 0.05nm<sup>2</sup>, or about 16ha. Grecian Rocks SPA covers an area of approximately 0.3nm<sup>2</sup>, or about 107ha. Both areas capture the main reef features of the area.

Dry Rocks and Grecian Rocks both have excellent accessibility and host a wide range of user activities including commercial diving, snorkeling, and fishing. The presence of the SPAs helps alleviate the extensive conflict that currently exist between fishermen and divers, with minimal displacement of either user group. Both areas have been degraded by heavy use, and warrant further protection. The SPAs will be good candidates for the application of carrying capacities and other research efforts.

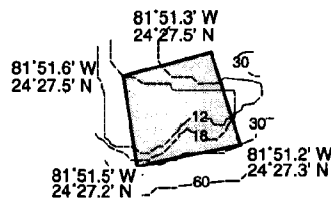
## Sanctuary Preservation Area: Eastern Dry Rocks, Rock Key, Sand Key



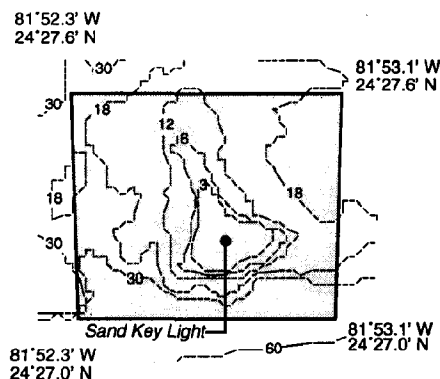
**Eastern Dry Rocks**



**Rock Key**



**Sand Key**



500 Meters  
Bathymetry is in feet

## Description

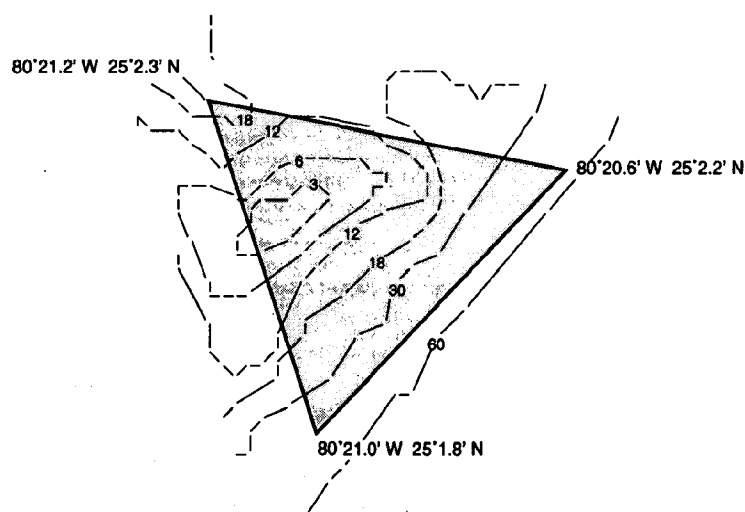
These three areas contain a concentration of important bank reef habitats within a small area. The three Sanctuary Preservation Areas (SPAs) are located approximately 5nm (10km) southwest of Key West.

The largest of the three SPAs is Sand Key. The boundary for the Sand Key SPA extends seaward to between the 30- and 60-foot depth contour, but portions of the rubble ridge will be open to existing activities. Catch and release fishing by trolling is allowed in this SPA. The approximate area of this SPA is 0.5nm<sup>2</sup>, or about 150ha.

At Rock Key and Eastern Dry Rocks, two small SPAs have been created using the reef crest and the 30-foot depth contour as boundaries. A depth of 4 feet along the reef flat marks the east and west boundaries of these two smaller SPAs. Both Rock Key and Eastern Dry Rocks have areas of approximately 0.1nm<sup>2</sup>, or about 30ha.

The three reefs are easily accessible from Key West and are of high economic value. The area is considered very important for charter boat fishing, sportfishing, diving and lobster fishing. As a result, there are high user conflicts that SPAs will help to alleviate.

## Sanctuary Preservation Area: French Reef

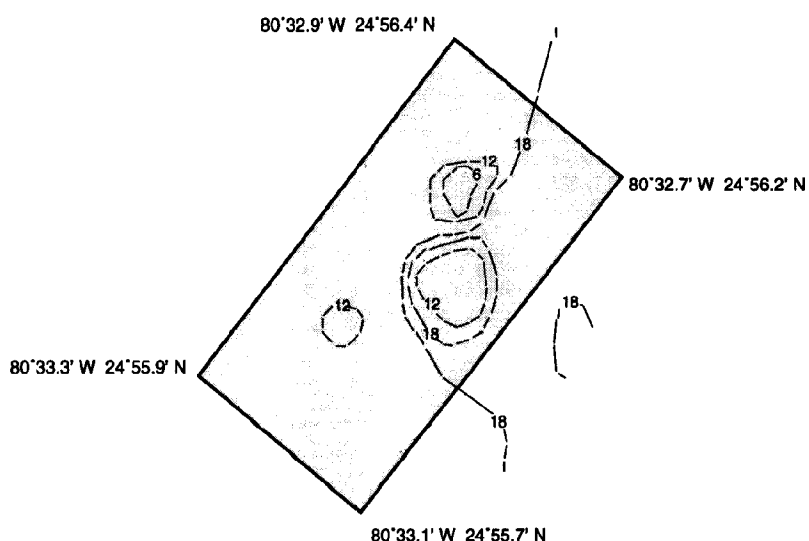
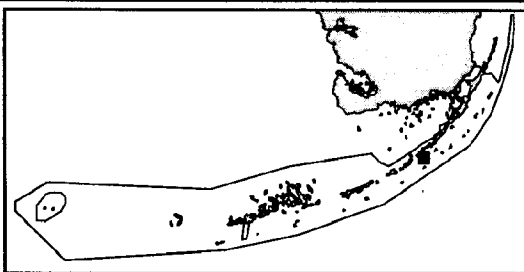


### Description

French Reef contains many caves and arches within its spur-and-groove system. The Sanctuary Preservation Area (SPA) is north of Molasses Reef, approximately 6nm (11km) southeast of Key Largo.

The SPA is triangular and covers an area of approximately 0.1nm<sup>2</sup>, or about 37ha. It includes an area from the rubble field to the 60-foot depth contour, and captures the caves and arches, while many of the lobster fishermen use the surrounding areas. The area's research potential is poor because of its easy access.

## Sanctuary Preservation Area: Hen and Chickens



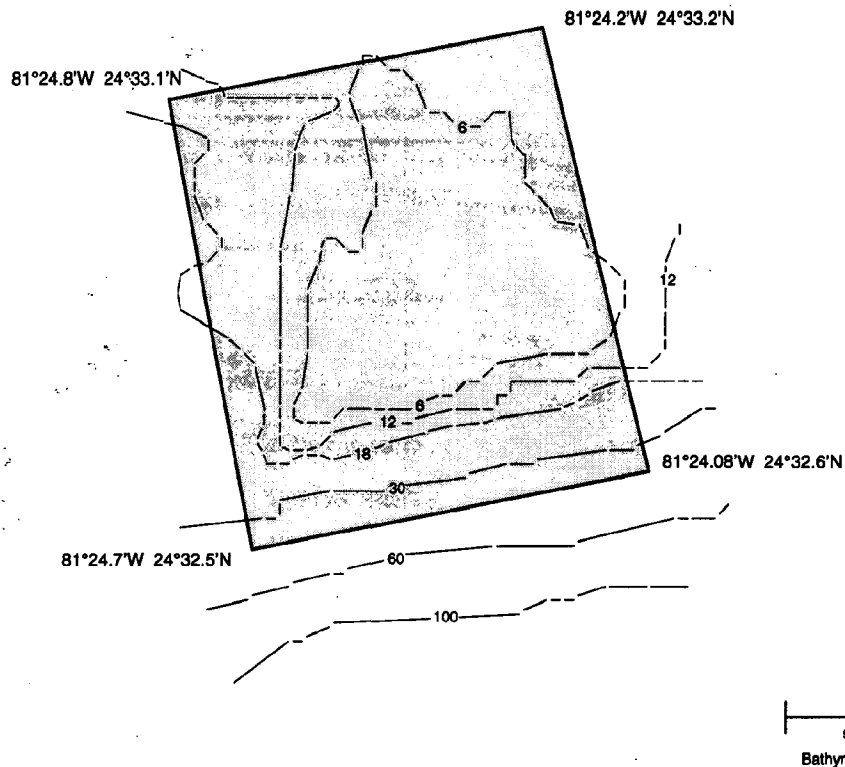
### Description

Hen and Chickens is a unique mid-channel patch reef complex with growths of star coral that are beginning to show signs of damage and decline. The Sanctuary Preservation Area (SPA) is approximately 2nm (4km) off of Plantation Key, in the middle of Hawk Channel.

The SPA is rectangular and covers approximately 0.2nm<sup>2</sup>, or about 60ha. Its boundary encompasses the patch reef complex and the star coral.

Hen and Chickens is easily accessible, and currently has mooring buoys installed. The area is a high-use, low-conflict zone, except during the sport lobster season when it is heavily impacted and user conflicts may be numerous.

## Sanctuary Preservation Area: Looe Key

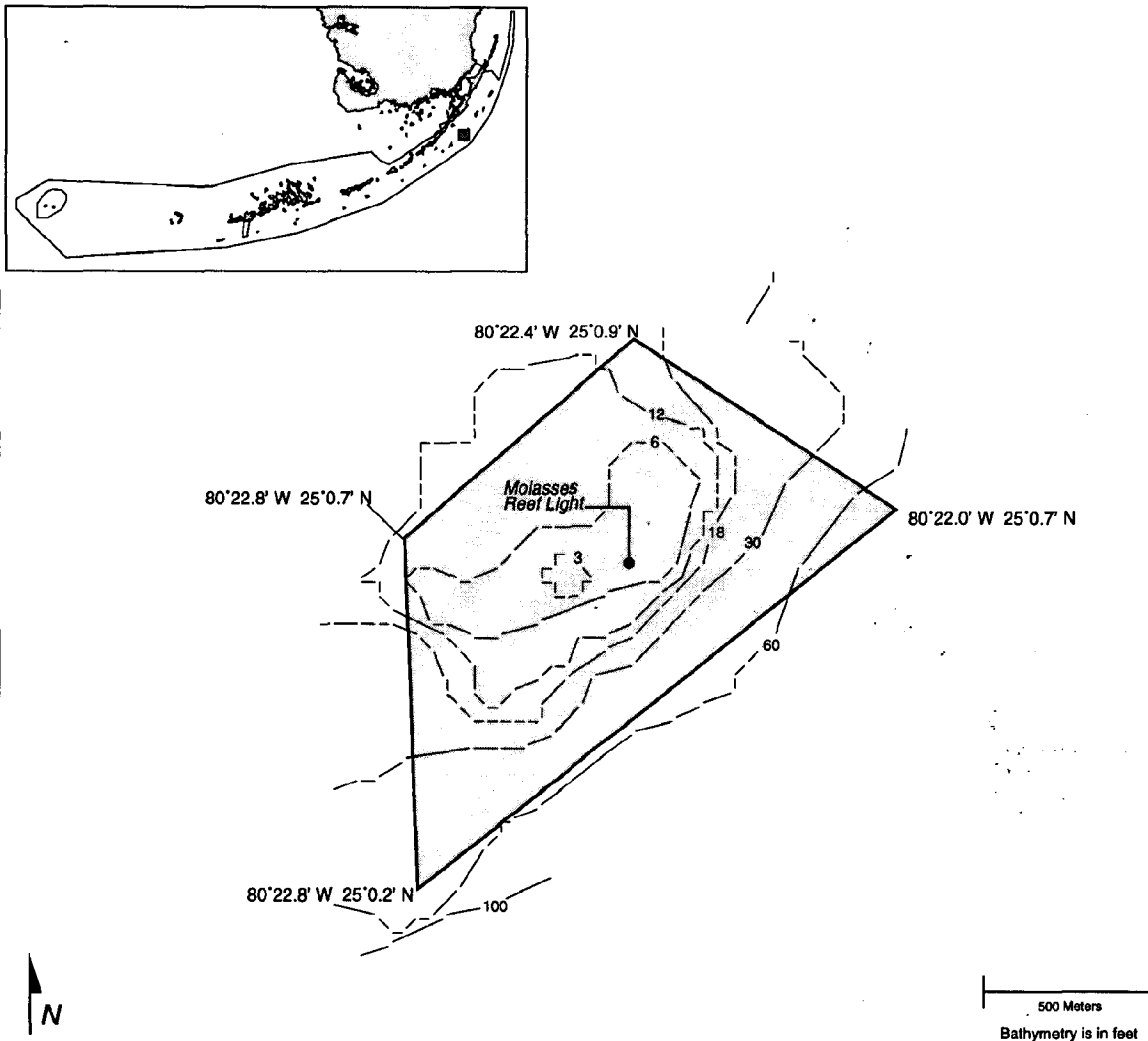


## Description

The ecological importance of Looe Key has been established through the creation of Looe Key National Marine Sanctuary. The Sanctuary Preservation Area (SPA) expands the current core area of the Looe Key National Marine Sanctuary. The expanded area includes some of the transitional and intermediate reef features on the seaward side and a larger portion of the seagrass community and rubble field on the landward side of the reef. It is located approximately 5.5nm (10km) south of Ramrod Key and about 8nm (15km) southwest of Bahia Honda State Park.

The SPA is rectangular and extends seaward to the approximate 45-foot depth contour. It covers approximately 0.3nm<sup>2</sup>, or about 115ha. Increasing the size of the protected area around Looe Key benefits the entire reef habitat and will have little effect on current users because of existing Sanctuary regulations.

## Sanctuary Preservation Area: Molasses Reef



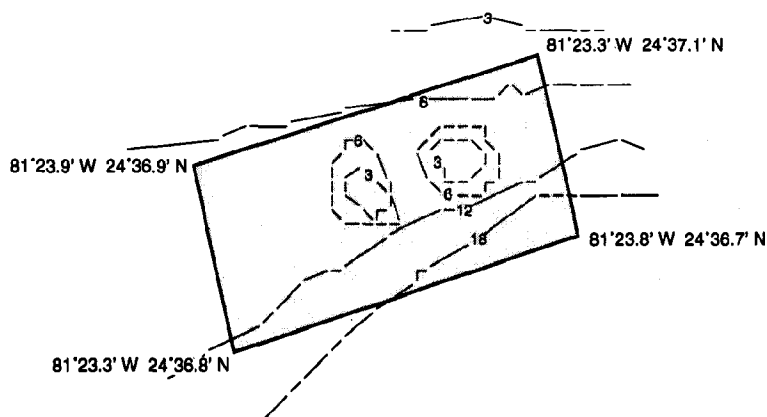
### Description

Molasses Reef contains a significant number of boulder corals, and has a well-developed spur-and-groove system that includes a deep wall. The Sanctuary Preservation Area (SPA) is located approximately 6nm (11km) southeast of Key Largo, near Rock Harbor.

The SPA includes a portion of the rubble field and extends to the 60-foot depth contour to protect the spur-and-groove system, the reef crest, and the deep wall. It covers an area of approximately 0.3nm<sup>2</sup>, or about 90ha.

Molasses Reef is highly accessible, and is the most heavily visited reef in the Upper Keys for diving. Establishing the SPA reduces conflicts between recreational hook-and-line fishermen and divers.

## Sanctuary Preservation Area: Newfound Harbor Key



### Description

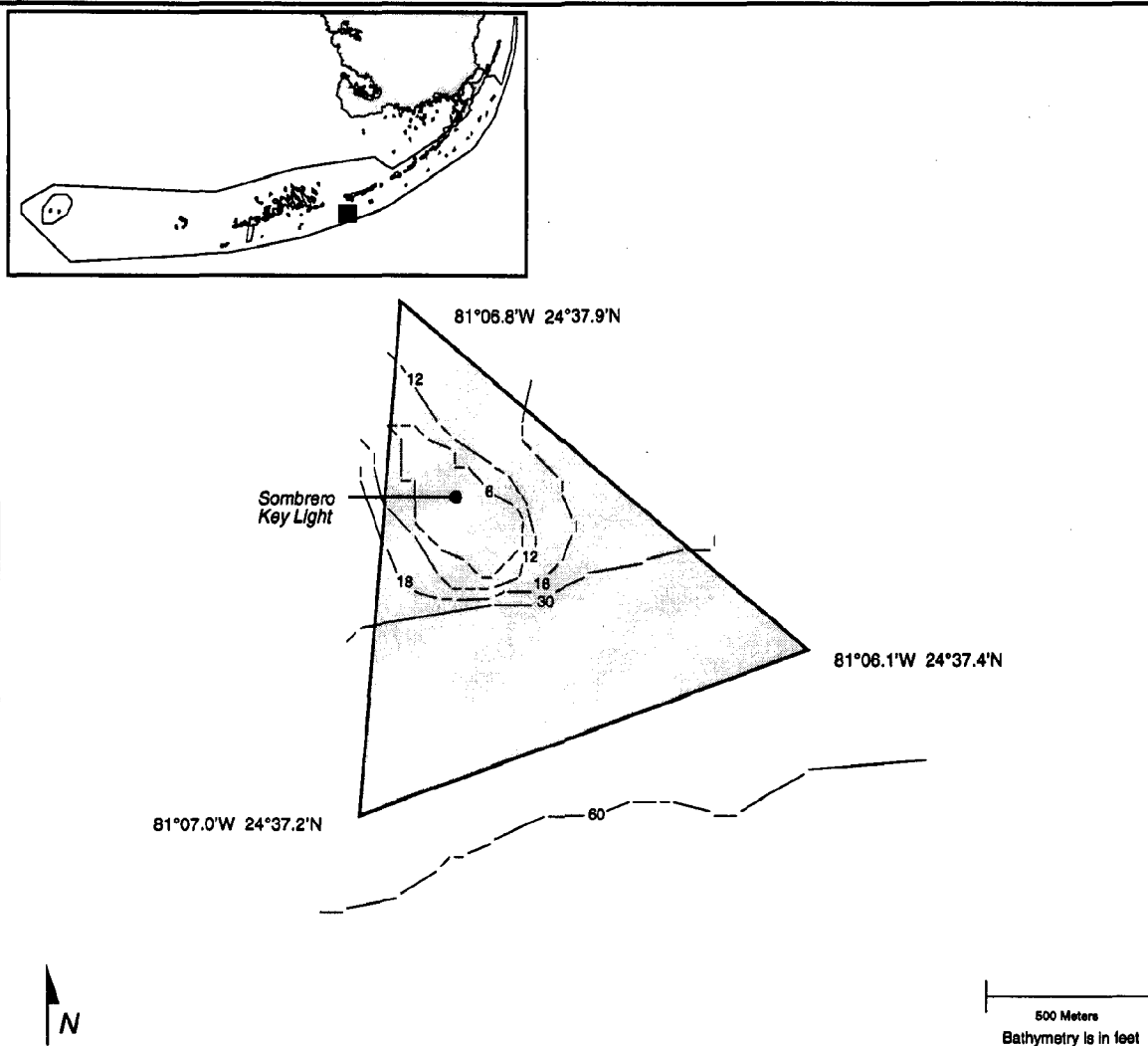
Newfound Harbor Key contains a series of nearshore patch reefs close to Newfound Harbor. The Sanctuary Preservation Area (SPA) is the only inshore patch reef complex protected in the Lower Keys. It is located less than 0.5nm (<1km) from the entrance to Newfound Harbor.

The SPA is rectangular and centered on two patch reefs along the shoreline near Newfound Harbor. The seaward boundary is the 18-foot depth contour and the landward boundary will allow boats and other watercraft sufficient passage along the shore. It covers an area of approximately 0.1nm<sup>2</sup>, or about 40ha.

Newfound Harbor has good accessibility. Although a total number of users is small, it is a high-use area for bait fishing, spearfishing, and environmental education activities. Other nearshore patch reefs in the area will remain open to users.



## Sanctuary Preservation Area: Sombrero Key



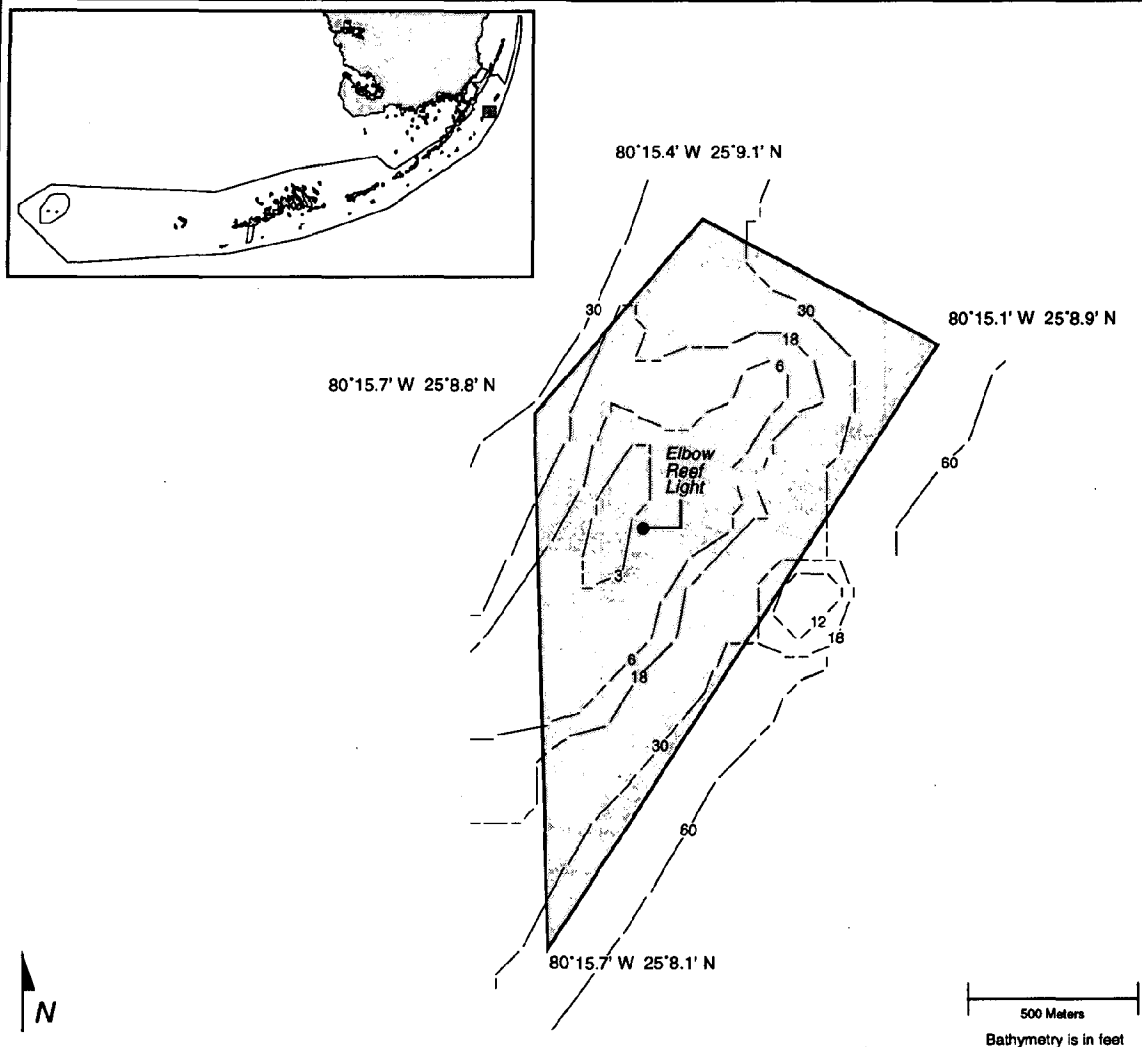
### Description

Sombrero Key has a spur-and-groove reef formation with stands of elkhorn coral. The Sanctuary Preservation Area (SPA) is located approximately 3.5nm (6km) seaward of Boot Key. The historic Sombrero Key Light is in the northern corner of this triangular SPA.

The SPA covers an area of approximately 0.2nm<sup>2</sup>, or about 73ha. It captures the reef crest, spur-and-groove system, and some of the rubble field.

Diving and snorkeling currently occurs in and around this high-use area. Most commercial fishing occurs seaward on the reef, while most recreational fishing occurs to the back and at the sides of this site. Catch and release fishing by trolling will be allowed in this SPA. Current conflicts between divers and recreational fishermen will be addressed by the proposed boundaries. Existing users will not be dramatically displaced, and conflicts between user groups will be reduced.

## Sanctuary Preservation Area: The Elbow



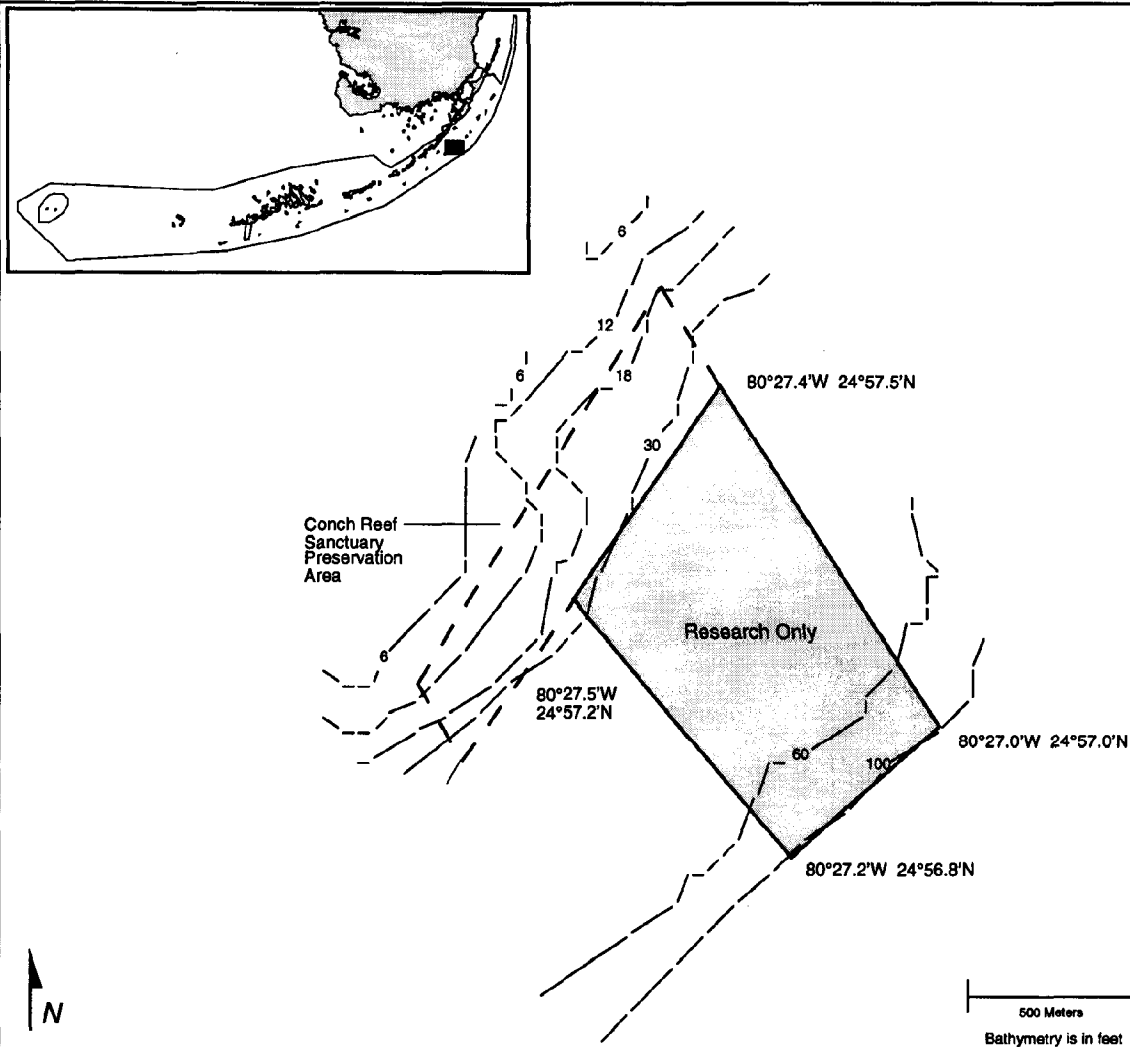
### Description

The Elbow is a bank reef with a well-defined spur-and-groove system and healthy deepwater corals. The Sanctuary Preservation Area (SPA) is located approximately 5.5nm (10km) southeast of Key Largo.

The SPA is irregularly shaped and covers approximately 0.3nm<sup>2</sup>, or about 90ha. It includes the reef crest, rubble horns, and deepwater corals. Its seaward boundary extends to the 30-foot depth contour.

Lobster fishermen and ballyhoo fishermen use the reef and the surrounding area. There is significant recreational fishing adjacent to, and seaward of, the reef. The level of conflict between users is currently minimal because the area is not heavily used.

## Special-use Area: Conch Reef (Research Only)

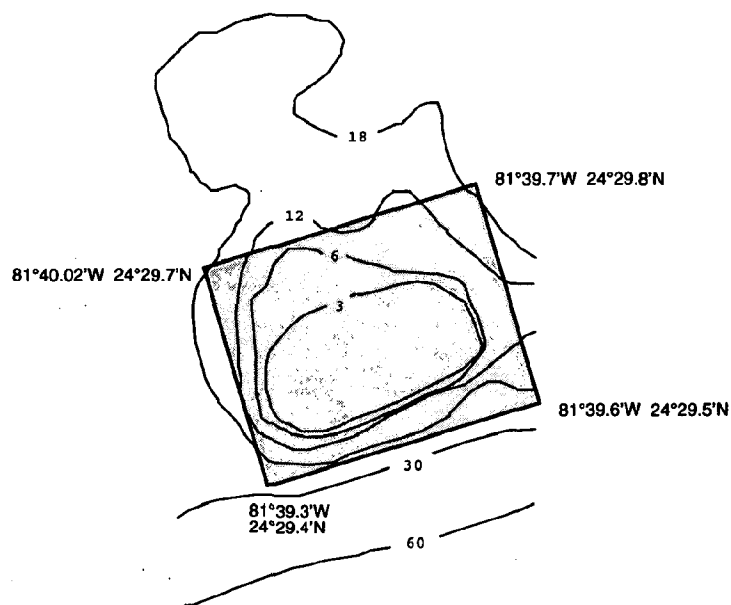


### Description

Conch Reef contains stands of rare pillar coral and provides excellent habitat for conch. The seaward side has one of the best developed reef wall systems in the keys. Octocorals and basket sponges are also present at this site. This Special-use Area is located approximately 5nm (9km) southeast of Tavernier and is adjacent to the Conch Reef Sanctuary Preservation Area (SPA).

The Special-use Area is designated as "Research Only," and will provide an area for the Aquarius underwater laboratory to conduct research. The boundary of the Research Only area approximates the current designated "no anchor" zone for the Aquarius underwater laboratory. There is heavy diving activity landward in the adjacent SPA, and recreational fishermen troll the reef wall in 160 to 180 feet of water.

## Special-use Area: Eastern Sambos (Research Only)

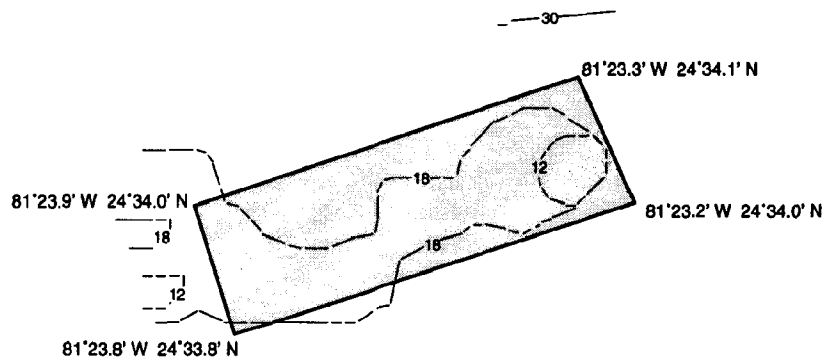
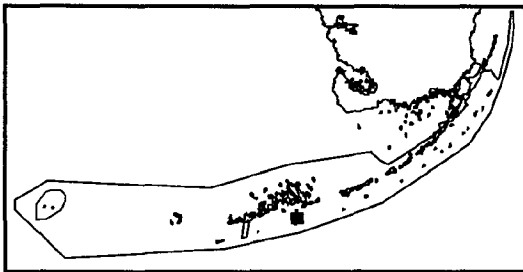


500 Meters  
Bathymetry is in feet

### Description

Eastern Sambos is a spur-and-groove bank reef with excellent coral formations. It is located in a region of the Keys that currently has some of the best remaining water quality along the reef tract. It is not heavily used by divers and will serve as an excellent shallow reef community to compare with Tennessee Reef that in contrast is located in an area of poor water quality, opposite of Florida Bay. By scientifically comparing these sites, researchers will be able to separate impacts from overuse with those from poor water quality.

## Special-use Area: Looe Key (Research Only)

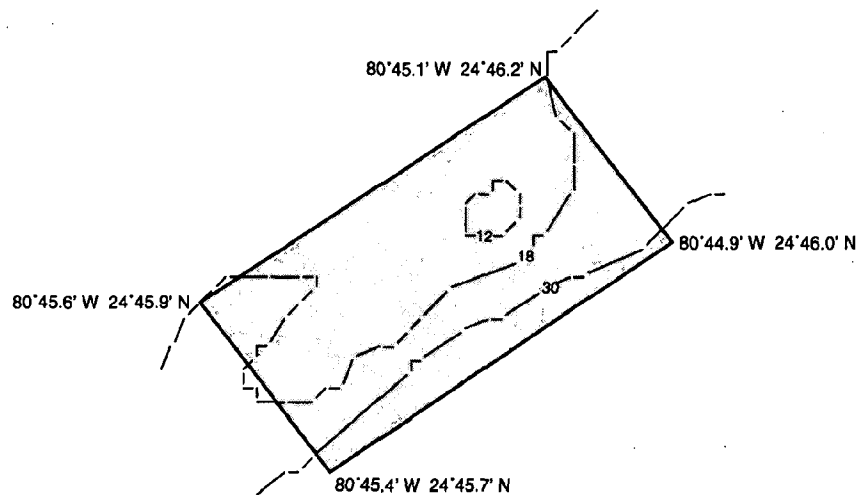


### Description

The Looe Key Special-use Area lies inshore of the core area of the current Looe Key National Marine Sanctuary, approximately 5.5nm (10km) south of Ramrod Key and about 8nm (15km) southwest of Bahia Honda State Park. The zone is rectangular and is centered on the mid-channel patch reefs in the northeast corner of the Sanctuary. It covers an area of approximately 0.1nm<sup>2</sup>, or about 34ha.

The zone is designated as "Research Only," and is the only offshore patch reef complex protected in the Lower Keys. Because the area is already protected as a national marine sanctuary, the Special-use Area will have very little impact on current users and is a good choice for continued research activities.

## Special-use Area: Tennessee Reef (Research Only)



500 Meters  
Bathymetry is in feet

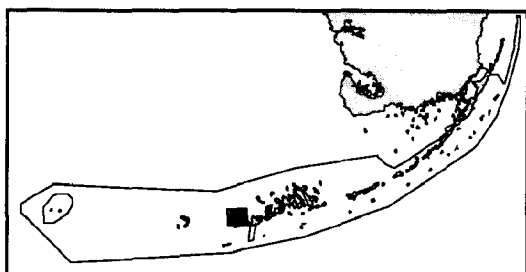
### Description

Tennessee Reef is a coral reef habitat containing a deep spur-and-groove system. It contains unique deepwater, slow-growth corals and sponges, and is located approximately 4nm (7km) south of Long Key. This Special-use Area is designated as "Research Only."

The area is rectangular and covers 0.2nm<sup>2</sup>, or about 53ha. It extends seaward to the 30-foot depth contour and contains the drowned spur-and-groove system and the unique deepwater corals.




Tennessee reef is a low-use area since it is relatively inaccessible and contains no mooring buoys. While divers occasionally visit the area, it is not a prime dive spot. Fishing and lobster trapping occurs inshore from the reef. The area has good potential as a research site because of its relative inaccessibility and low level of use. Its location in the path of waters from the Florida Bay will give scientists an excellent site to compare with a "Research Only" site that has low use, but is located in an area with good water quality.

## Wildlife Management Area: Bay Keys

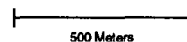
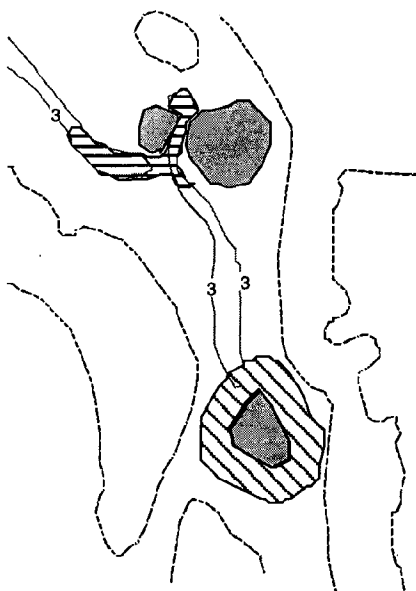


*Boundaries shown are approximate.*

### Type of Restriction

-  No-motor Zone
-  Idle-speed Only/No Wake Zone
-  Low-water Line

Bathymetry is in feet.



## Description

The Bay Keys are a series of islands approximately seven kilometers north of Key West. Aside from the Northwest Bay Key, the islands are unspoiled and largely composed of red mangroves. The largest key harbors great white herons and a considerable number of tricolored and little blue herons. **Restriction:** A 300-foot (91m) no-motor zone is created around one island and idle-speed only/no wake zones are established in tidal creeks. Disturbance to nesting and roosting birds is decreased by the no-motor and idle-speed zones without impact to boaters.

## Wildlife Management Areas: Boca Grande Key, Woman Key



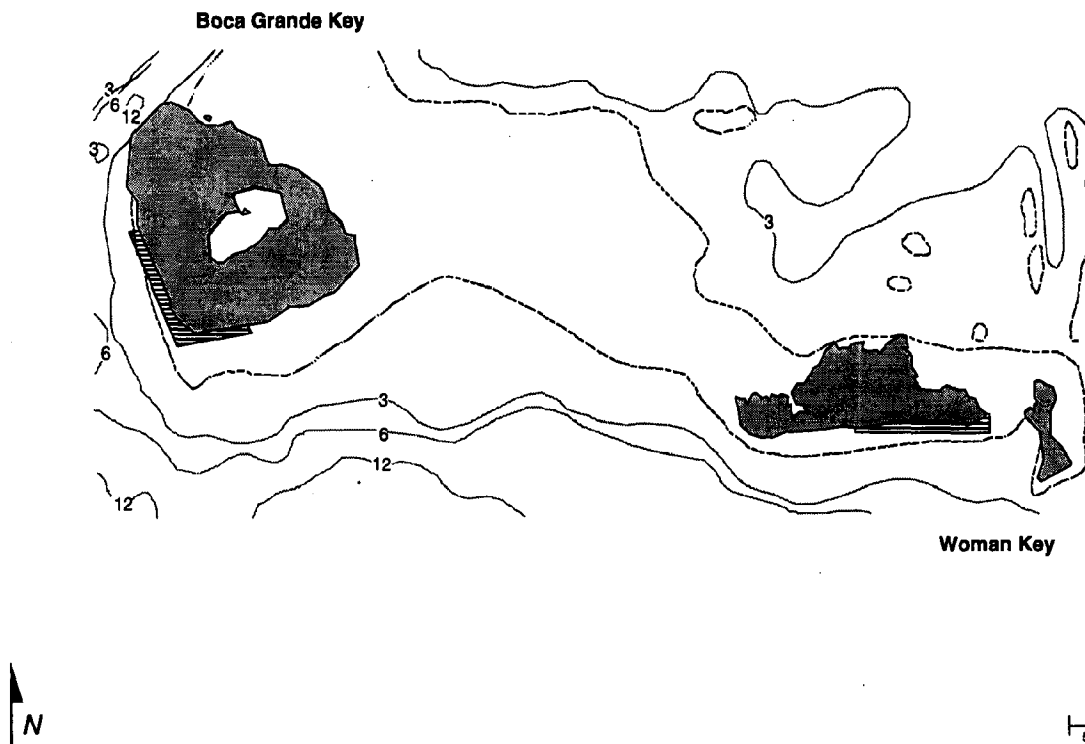
Type of Restriction .

 Beach Closed

 Low Water Line

Bathymetry is in feet.

**Boundaries shown are approximate.**



### Description

Boca Grande Key is located about 22 kilometers west of Key West. It has an extensive, narrow, low-energy beach on the west and southwest side, which extends almost to the northern tip of the island. There is a relatively large interior pond on the shallow wash flats behind the dunes on the southwest side. Many species of birds use this area, including some that are listed as federally endangered and threatened. **Restriction:** *Half of the beach is closed. (Beach above mean high tide is closed by the U.S. Department of the Interior).* The most heavily used public-use area is still open.

Woman Key is located about 21 kilometers west of Key West. The island contains an extensive south-facing, low-energy beach and associated dunes. Shallow-water flats (hardbottom) border most of the beach. Loggerhead turtles nest on the beach and dunes. Several species of wading birds also nest in the area and a large number of shorebirds use the sand spits on the southeast side of the island. **Restriction:** *Half of the beach and sand spit on the southeast side is closed. (Beach above mean high tide is closed by the U.S. Department of the Interior).* The remainder of the beach remains open to the public.



## Wildlife Management Area: Cayo Agua Keys



*Boundaries shown are approximate.*

### Type of Restriction

 Idle Speed Only/No Wake Zone

 Low Water Line

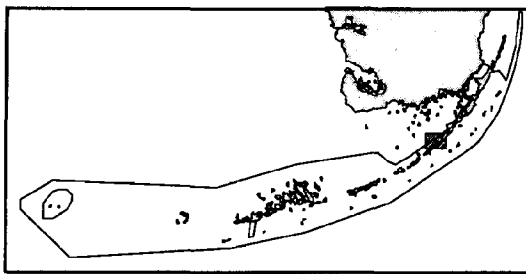
Bathymetry is in feet.



## Description

This series of islands located approximately 10 kilometers northeast of Key West, is dissected by tidal creeks. All of the Cayo Agua islands consist largely of red mangroves and are used by great white herons and ospreys. **Restriction: Idle-speed only/no wake zones are created in each of the navigable tidal creeks.** No major impacts on users are expected.

## Wildlife Management Areas: Cotton Key, Snake Creek



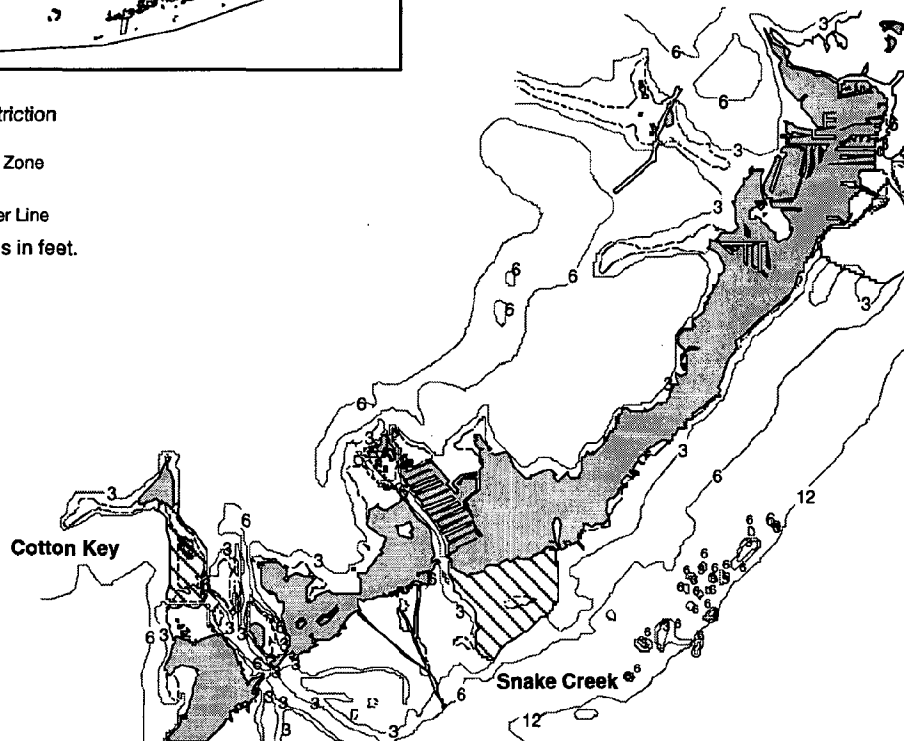
Boundaries shown are approximate.

### Type of Restriction

 No Motor Zone

 Low Water Line

Bathymetry is in feet.

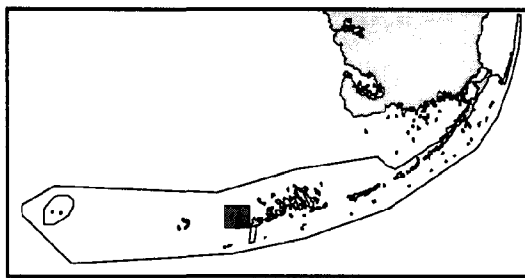


## Description

Cotton Key is located in the Upper Keys, off the northeastern tip of Upper Matecumbe Key. It is an area of very shallow flats that are heavily used by a variety of birds as well as bonefish and other desirable fish species. There are also several small mangrove islands that serve as nesting sites for a variety of birds, including pelicans, cormorants, and at least four species of herons. Cotton Key is also a preferred roost for magnificent frigatebirds. **Restriction: There is a no-motor zone on the tidal flat.** Shallow-water boats and PWC have modified access to the area.

Snake Creek is located in the Upper Keys, east of Windley Key. It is an area of very shallow flats that are heavily used by a variety of birds, as well as bonefish and other desirable fish species. **Restriction: There is a no-motor zone on the tidal flat.** Shallow water boats and PWC have modified access to the area.

## Wildlife Management Areas: Cottrell Key, Little Mullet Key, Big Mullet Key



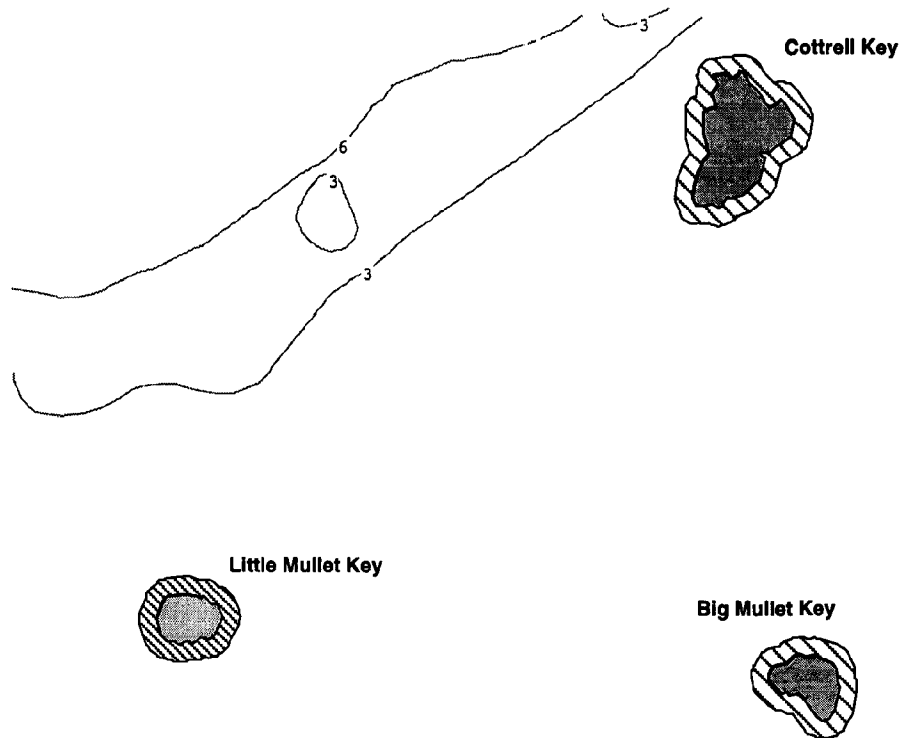
### Type of Restriction

No Access Buffer

No Motor Zone

Bathymetry is in feet.

**Boundaries shown are approximate.**



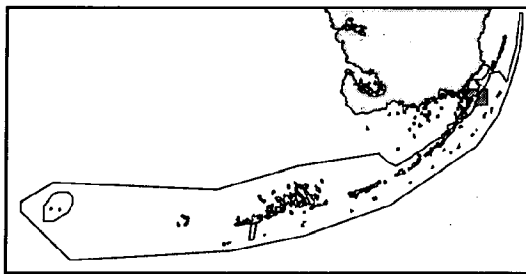
## Description

Little Mullet Key is a small mangrove located about 15 kilometers northwest of Key West. **Restriction: A 300-foot (91m) no-access buffer zone is created around the island.** Vessel traffic is prevented from approaching the island.

Big Mullet Key is located about 15 kilometers northwest of Key West. The island harbors nesting great white herons and a variety of other wading birds. Mangrove terrapins are also present. **Restriction: A 300-foot (91m) no-motor zone is created around the island.**

Cottrell Key is located about 15 kilometers northwest of Key West. It contains a variety of wading birds, and mangrove terrapins. **Restriction: A 300-foot (91m) no-motor zone is created around the island.** Boat traffic has modified access to the island.

## Wildlife Management Area: Crocodile Lake



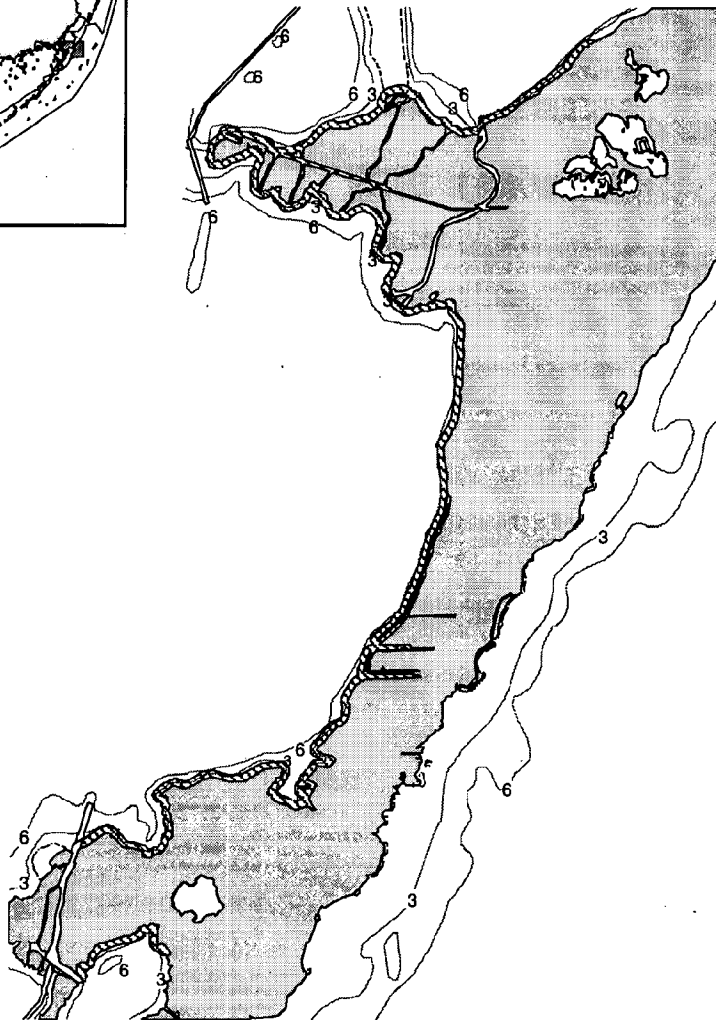
### Type of Restriction

 No Access Buffer

 Low Water Line

Bathymetry is in feet.

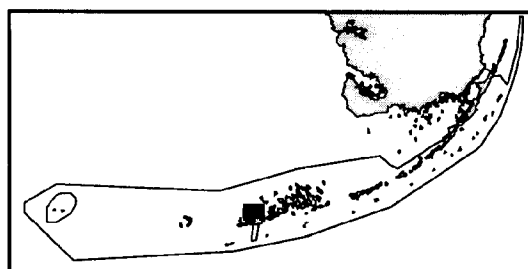
**Boundaries shown are approximate.**



## Description

Crocodile Lake is located in the Upper Keys, along the eastern shore of Card Sound. This area has the most extensive stands of tropical hardwood hammocks in the United States. It harbors a number of endangered and threatened species, including the American crocodile and the West Indian manatee. **Restriction: There is a 100-foot (30m) no-access buffer zone along the shoreline between March 1 and October 1.** Motorized vessels are prevented from approaching the shoreline. Jewfish and Steamboat Creeks remain open to motorized vessel traffic.

## Wildlife Management Areas: East Harbor Key, Lower Harbor Keys



*Boundaries shown are approximate.*

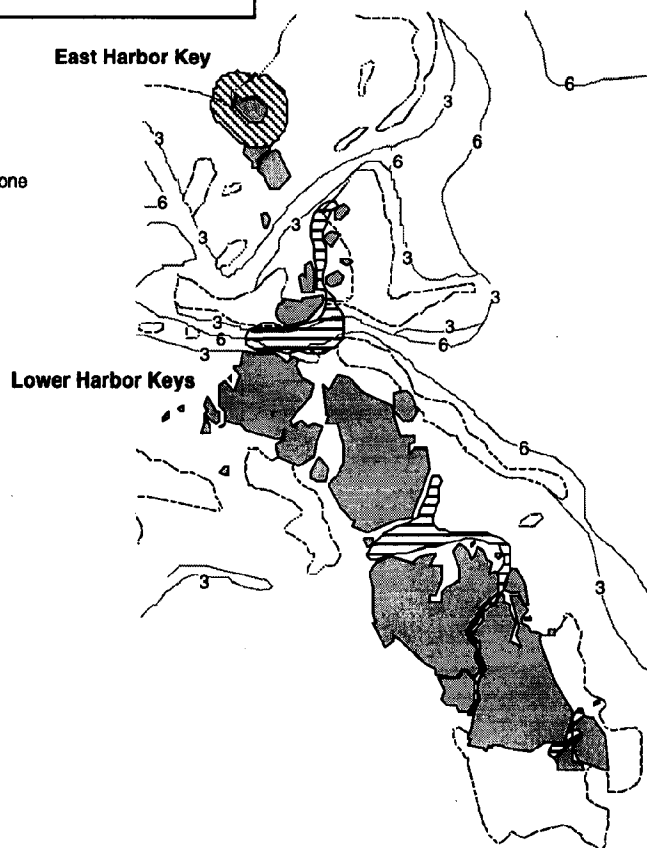
### Type of Restriction

 No Access Buffer

 Idle Speed Only/No Wake Zone

 Low Water Line

Bathymetry is in feet.

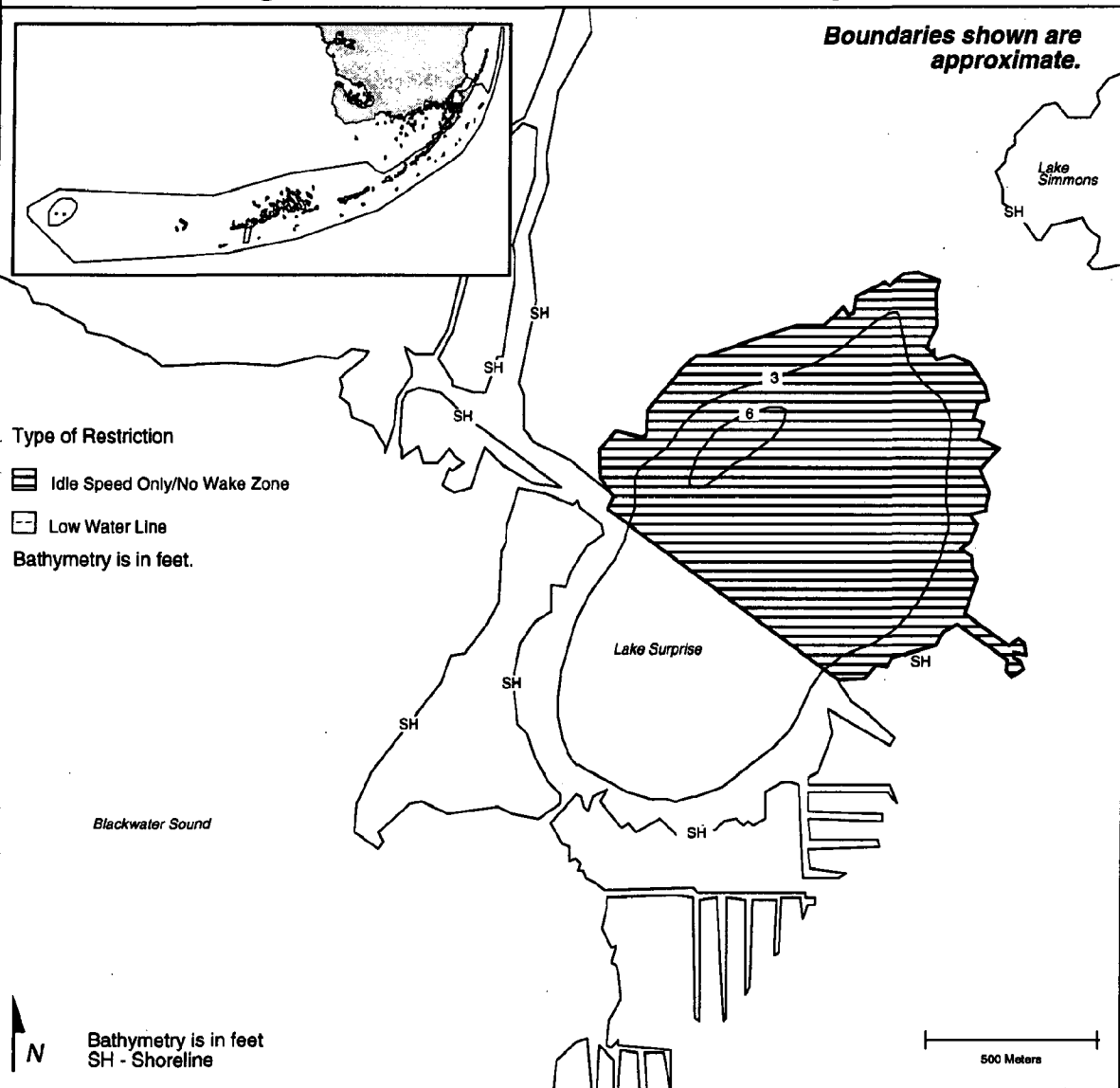


## Description

The East Harbor Keys are located approximately 15 kilometers northeast of Key West. All but one of the keys are mangrove islands. The islands are heavily used by boaters, especially on weekends. **Restriction: A 300-foot (91m) no-access buffer zone is established around the northern most island.** Boaters are displaced from the no-access zone.

The Lower Harbor Keys lie approximately 12 kilometers northeast of Key West, are dissected by tidal creeks, lack dry land, and are composed primarily of red mangroves. Most of the islands are accessible by navigable channels. The islands contain nesting great white herons, double-crested cormorants, and osprey. A variety of other wading birds use the islands as well. Boat traffic is sometimes heavy on weekends. **Restriction: Idle-speed only/no wake zones are created in selected tidal creeks.** This restriction will reduce the impact of boat traffic.

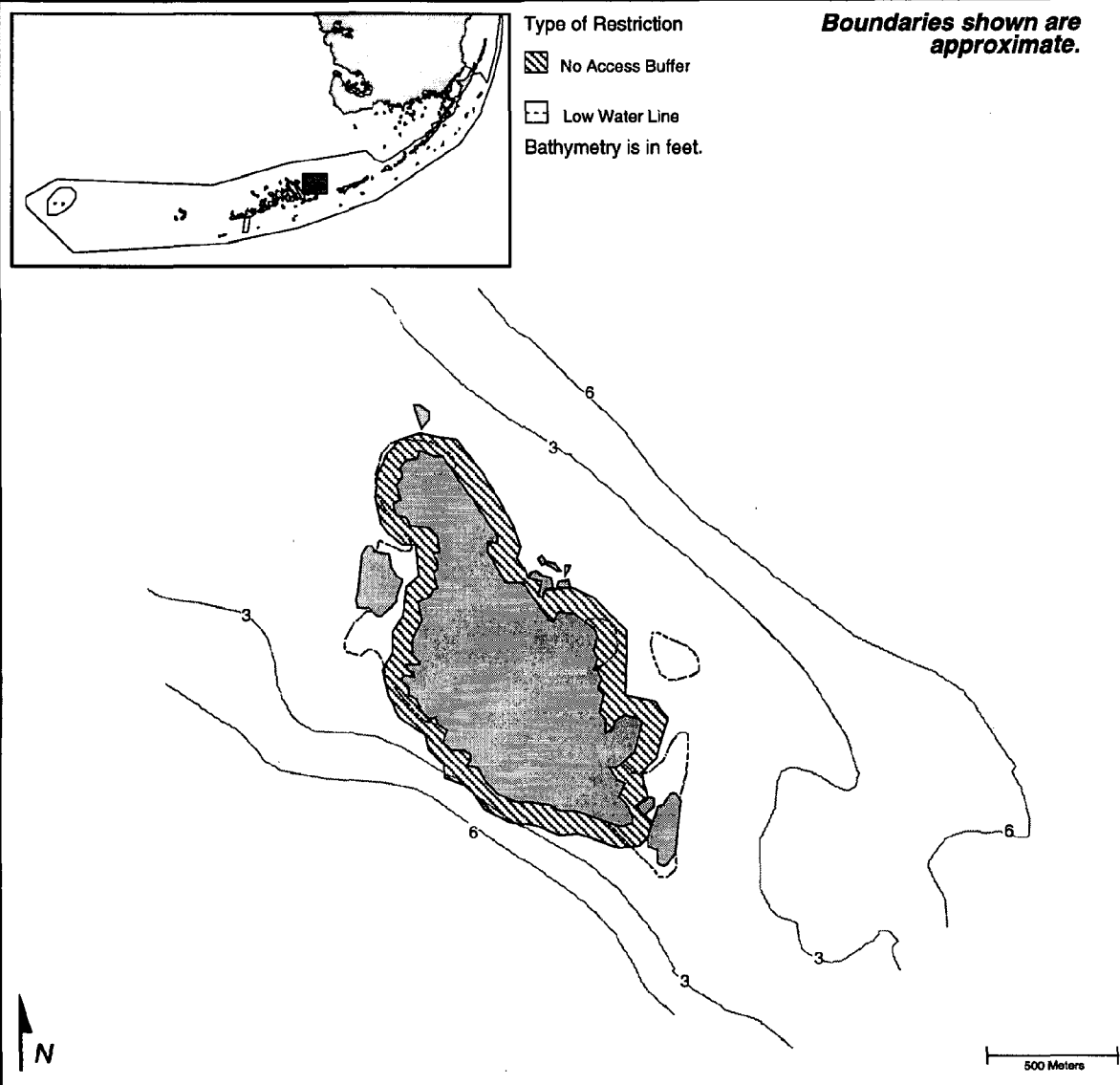
## Wildlife Management Area: Eastern Lake Surprise



## Description

Lake Surprise is located in the north Key Largo area. Currently, a man-made causeway composed of fill that serves as the base for Highway 1 (US) spans Lake Surprise and cuts it roughly in half. The western side is heavily used by recreational vessels and has remained isolated to the eastern side by the causeway. Future improvements to US 1 call for a bridge to span Lake Surprise. The causeway will be removed, thus improving water circulation in the area. In order to protect the endangered American crocodile and West Indian manatee that inhabit the area from vessel traffic. **Restriction: Idle speed only/no wake zone east of US 1.**

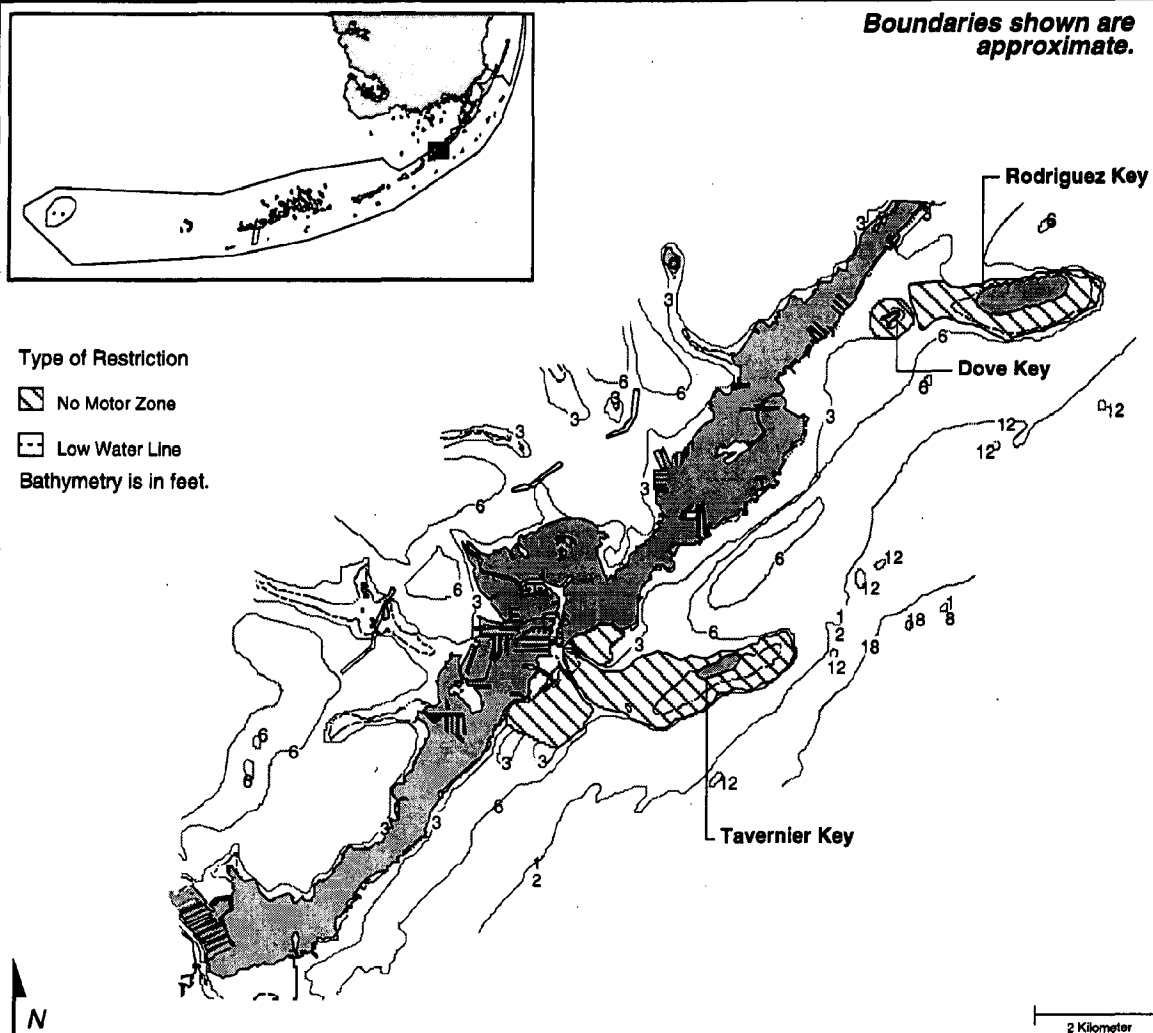
## Wildlife Management Area: Horseshoe Key



### Description

Horseshoe Key is a relatively large island bordered entirely by red mangroves, and is located approximately 20 kilometers northwest of Marathon. Two large openings on the island's interior contain salt prairies. Heron, willet, and osprey nesting sites have been documented. The island is closed to public access. **Restriction:** *There is a 300-foot (91m) no-access buffer zone around the main island. (The main island is closed by the U.S. Department of the Interior).* There has been minimal public use in the past, therefore, little impact on users is expected.

## Wildlife Management Areas: Rodriguez Key, Dove Key, Tavernier Key

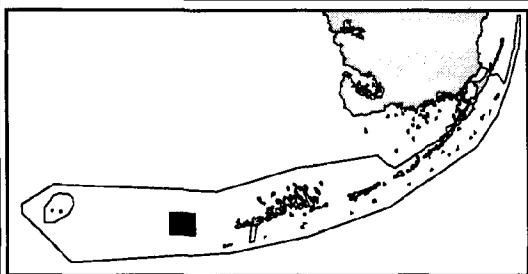


## Description

These three sites are in the Upper Keys. Rodriguez Key is located east of Key Largo. Dove Key is located between Key Largo and Rodriguez Key. Tavernier Key is located east of Key Largo and Plantation Key. They are each areas of very shallow flats that are heavily used by a variety of birds as well as bonefish and other desirable fish species. **Restriction:** *There is a no-motor zone on the tidal flats around each key. Additionally, the area around the two small islands of Dove Key is closed.*







## Wildlife Management Area: Marquesas Keys

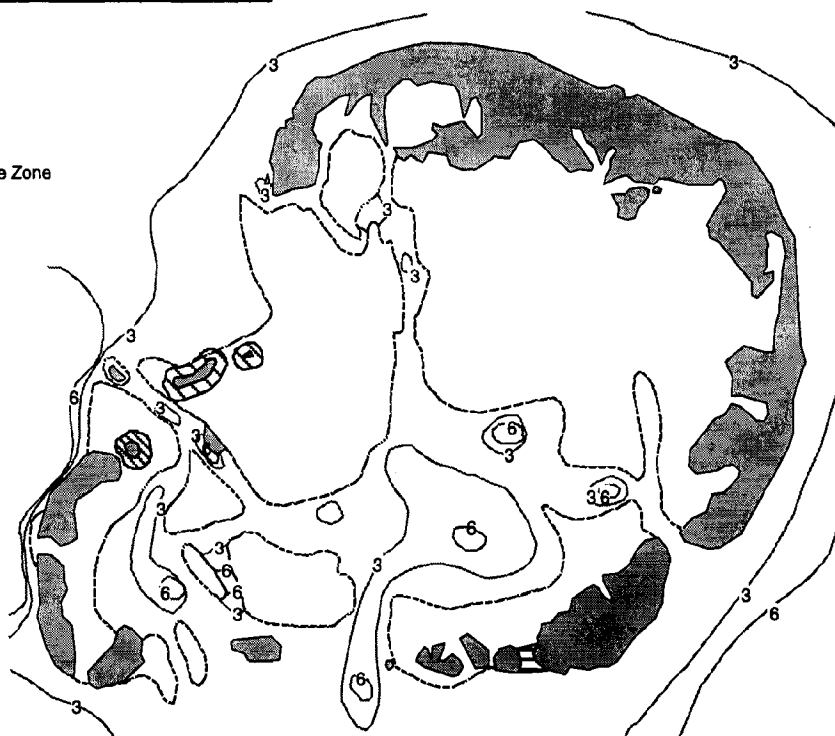


Boundaries shown are approximate.

### Type of Restriction

-  No Motor Zone
-  No Access Buffer
-  Idle Speed Only/No Wake Zone

 Low Water Line  
Bathymetry is in feet.

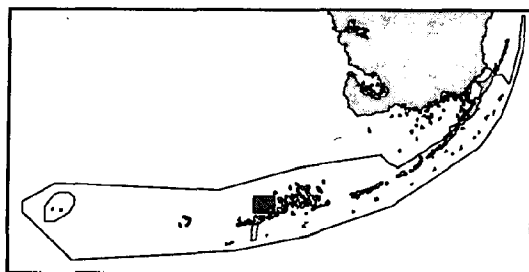


## Description

The Marquesas Keys are a chain of islands located approximately 40 kilometers west of Key West. They are characterized by an extensive network of low-energy beaches and dunes. Deepwater channels cut through the interior of the islands. The islands are used by sea turtles and birds for nesting, feeding, and roosting.




**Restriction:** A 300-foot (91m) no-motor zone is established around the three smallest islands, a 300-foot (91m) no-access buffer zone is established around one mangrove island, and an idle speed only/no wake zone is established in the southwest tidal creek. Historically, public use of the area has been low, and minimal impacts on users are expected.

## Wildlife Management Area: Mud Keys

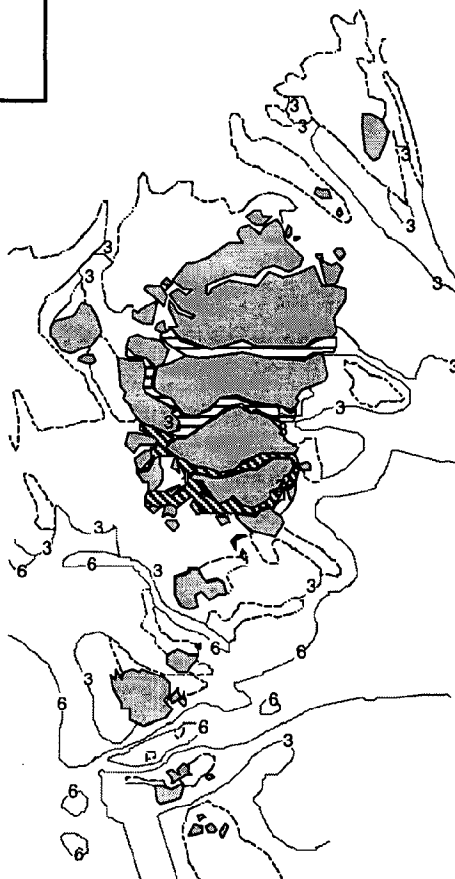


*Boundaries shown are approximate.*

### Type of Restriction

-  Closed
-  Idle Speed Only/No Wake Zone
-  Low Water Line

Bathymetry is in feet.

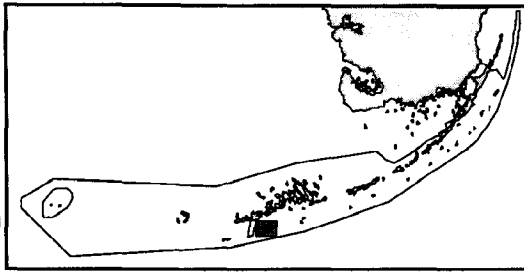


500 Meters

## Description

Mud Keys are a series of islands approximately 25 kilometers northeast of Key West that are highly dissected by navigable creeks. The islands consist almost entirely of red mangroves, although the northernmost island has considerable upland vegetation. The islands contain nesting ospreys and a small great white heron rookery. Frigatebirds sometimes roost on the islands. **Restriction: Idle-speed only/no wake zones are created in the two main tidal creeks. The two smaller creeks on the west side are closed to provide a sanctuary for birds.** Boaters will have modified access to this area.

## Wildlife Management Area: Pelican Shoal

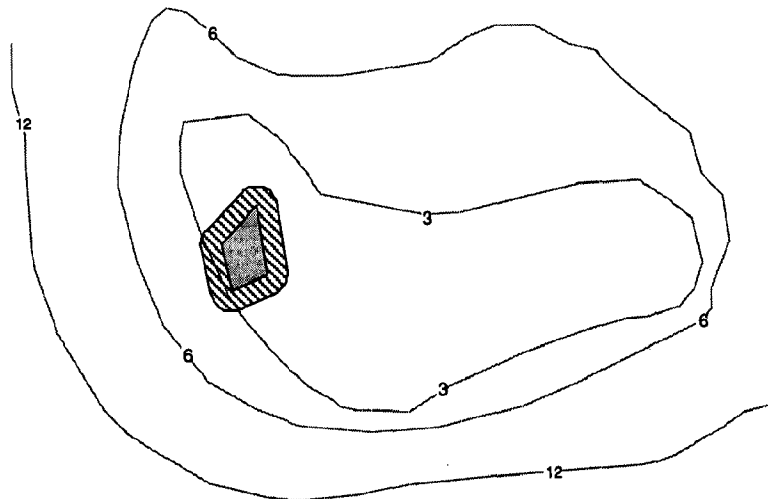


*Boundaries shown are approximate.*

### Type of Restriction

 No Access Buffer

Bathymetry is in feet.

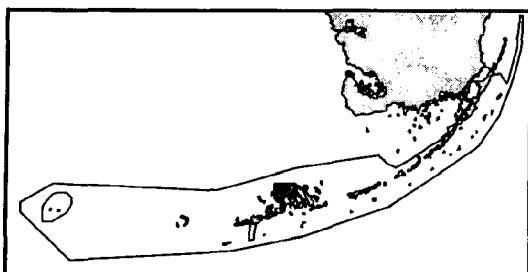


 50 Meters

## Description

Pelican Shoal is located approximately 9 kilometers southeast of Boca Chica. It is primarily a small rubble island that provides an important nesting site for birds. Visitor use is low in this area. **Restriction: No-access buffer zone is created out to 50 meters from shore between April 1 and August 31. (The shoal is closed by the Florida Game and Freshwater Fish Commission).** No major displacements of user groups will occur as a result of this new designation.

## Wildlife Management Area: Sawyer Keys



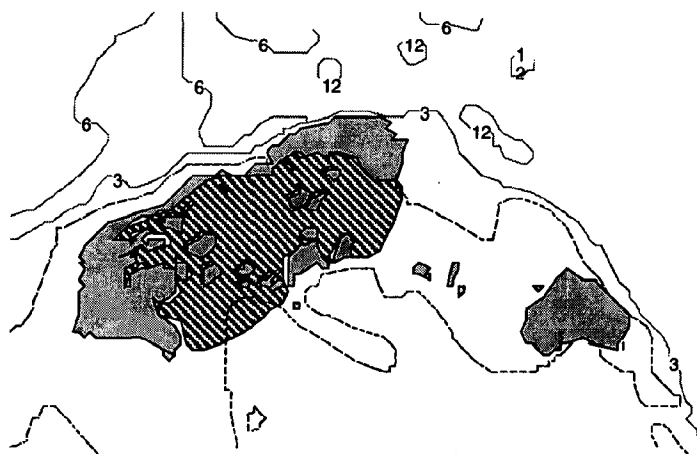
*Boundaries shown are approximate.*

### Type of Restriction

 Closed

 Low Water Line

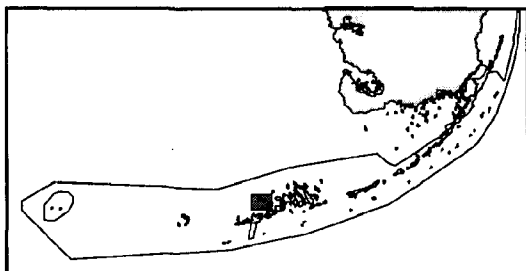
Bathymetry is in feet.



## Description

Sawyer Keys consist of a series of islands east of Johnston Key Channel, approximately 35 kilometers northeast of Key West. These islands are dissected by shallow, tidal creeks. The northwest side of the largest island is privately owned. Sawyer Keys harbor nesting ospreys. The area is also used by 11 species of wading birds. The area south of the two largest islands is an important staging area for migrant shorebirds in autumn. **Restriction:** *Tidal creeks on the south side of the islands are closed.* Vessel traffic will be prevented from using much of the site.

## Wildlife Management Area: Snipe Keys



*Boundaries shown are approximate.*

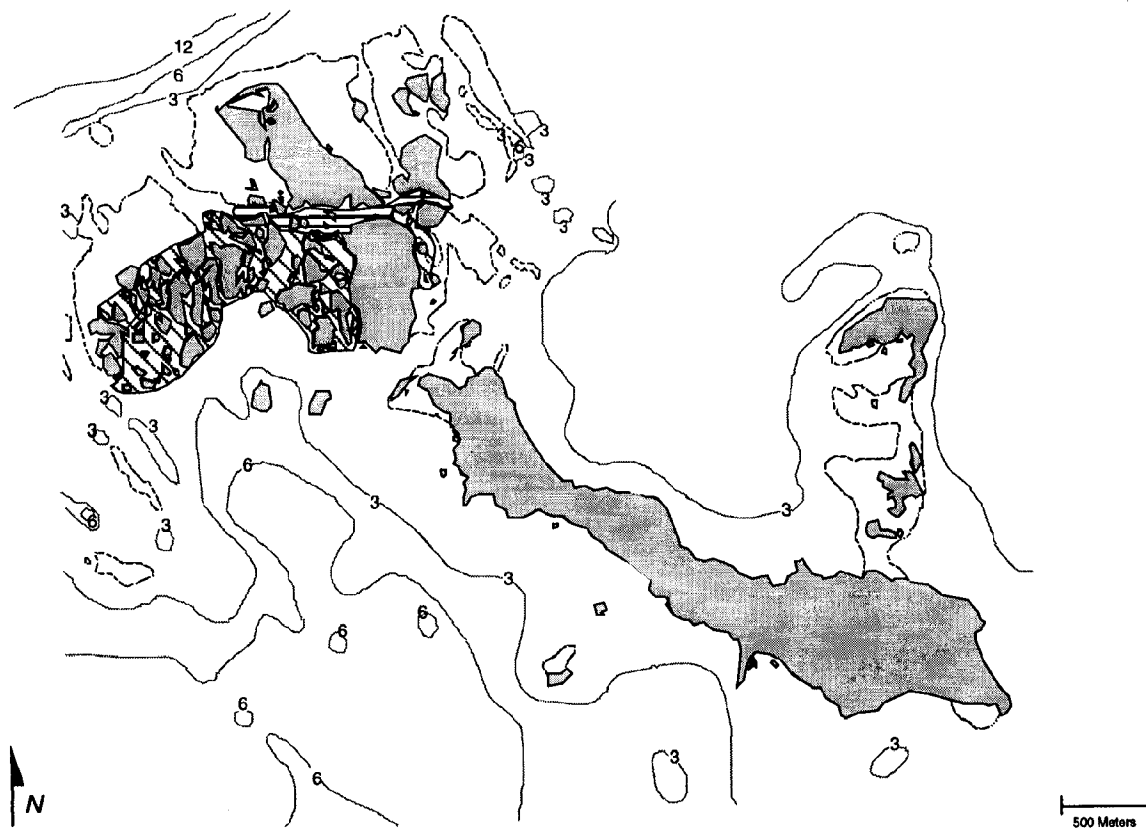
Type of Restriction

 No Motor Zone

 Idle Speed Only/  
No Wake Zone

 Low Water Line

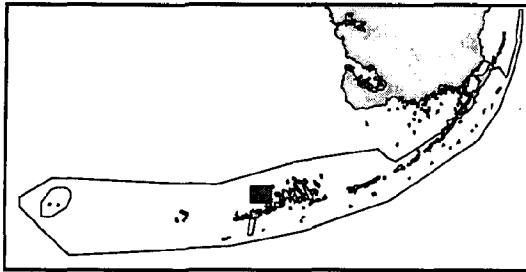
Bathymetry is in feet.



### Description

Snipe Keys are a group of small islands dissected by a maze of tidal creeks between Snipe Point and the Outer Narrows. Snipe Keys lie east of Mud Keys and approximately 25 kilometers northeast of Key West. Groups of little blue herons are present on the tidal creeks. Snipe Point is used by terns and various shorebirds. **Restriction: An idle-speed only/no wake zone is created for the main tidal creek. A no-motor zone will be established for the remaining creeks.** Boat traffic will have modified access to this area.

## Wildlife Management Area: Tidal Flat South of Marvin Key



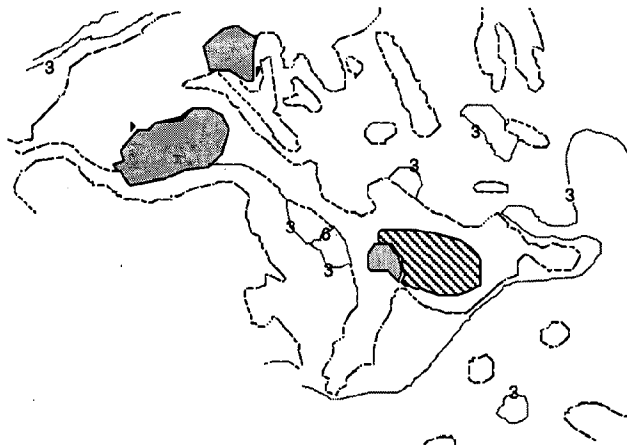
*Boundaries shown are approximate.*

### Type of Restriction

 No Access Buffer

 Low Water Line

Bathymetry is in feet.



## Description




The tidal flats south of Marvin Key cover one to two acres and are inundated at high tide. Marvin Key is located east of Mud Keys, approximately 25 kilometers northeast of Key West. Large numbers of resting shorebirds use the flats. **Restriction: A no-access buffer zone is created to protect birds resting on the flats.** Vessels and people will be prevented from entering the flats.

## Wildlife Management Areas: Upper Harbor Key, East Content Keys

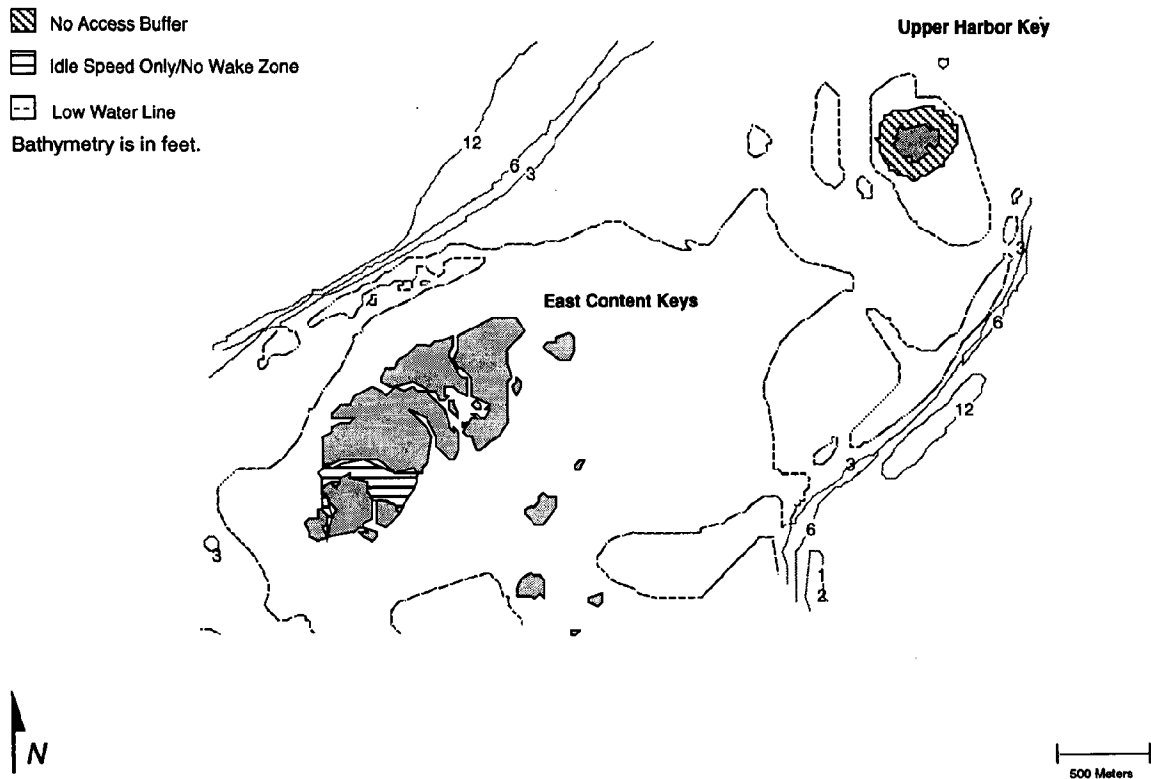


*Boundaries shown are approximate.*

### Type of Restriction

-  No Access Buffer
-  Idle Speed Only/No Wake Zone
-  Low Water Line

Bathymetry is in feet.



## Description

Upper Harbor Key is a mangrove island approximately 35 kilometers northwest of Marathon that is surrounded by flats but is accessible at high tide. It is a premier area for wading birds. The island is used by various bird species including ospreys, frigatebirds, double-crested cormorants, and wading birds. **Restriction: A 300-foot (91m) no-access buffer zone is created around the island.** Vessel traffic will be prevented from approaching the island.

The East Content Keys are approximately 40 kilometers northwest of Marathon. These islands, which are located east of Content Passage, are dissected by several shallow tidal creeks and are inaccessible to most vessels at low tide. Herons and white ibises use the interior tidal creeks. **Restriction: Idle-speed only/no wake zones are created in the tidal creeks.** Impacts from shallow-draft boats will be decreased.

## Wildlife Management Areas: West Content Keys, Little Crane Key



Boundaries shown are approximate.

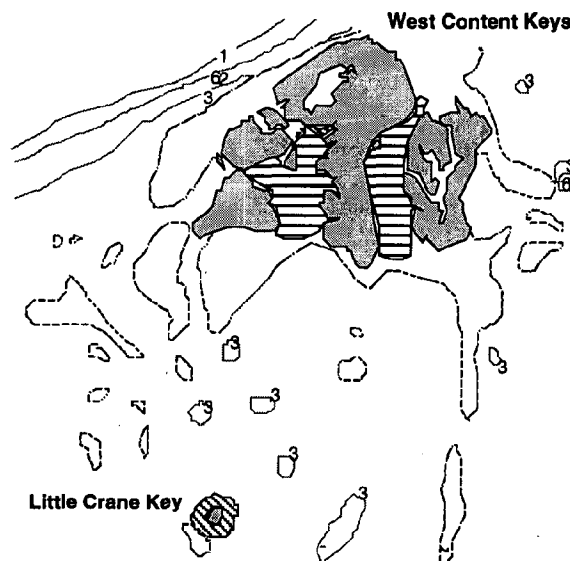
### Type of Restriction

 No Access Buffer

 Idle Speed Only/No Wake Zone

 Low Water Line

Bathymetry is in feet.



500 Meters

## Description

The West Content Keys lie approximately 40 kilometers northwest of Marathon, north of Little Crane Key. These islands, west of Content Passage, are accessible at high tides. Broad, shallow tidal creeks dissect the area, and nesting ospreys and wading birds inhabit the islands. **Restriction: Idle-speed only/no wake zones are established in selected tidal creeks, and a no-access buffer zone in one cove.** There will be decreased impacts from vessels using the tidal creeks.

Little Crane Key is a very small island between the Content Keys and Raccoon Key, approximately 40 kilometers northwest of Marathon. One side of the island has been eroded by storms. The island contains a large frigatebird roost and nesting areas for great egrets and double-crested cormorants. **Restriction: A 300-foot (91m) no-access buffer zone is placed around the island.** The buffer zone will displace vessel traffic and divers.



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### Preferred Alternative/Management Plan

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### Action Plans

#### Mooring Buoy Action Plan

Mathews, T.R., and P. Donovan-Potts, 1993. *An evaluation of mooring buoys in the Florida Keys National Marine Sanctuary based on boating patterns*. DNR Contract C-8013, Looe Key National Marine Sanctuary. 40 pp.

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#### Research and Monitoring Action Plan

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# Acronyms

<b>Acronym</b>	<b>Meaning</b>
ACSC	Areas of Critical State Concern
AICUZ	Air Installation Compatible Use Zones
APPS	Act to Prevent Pollution from Ships
ARPA	Archaeological Resources Protection Act
ASA	Abandoned Shipwreck Act
ATBAs	Areas to be Avoided
ATCA	Atlantic Tuna Convention Act
AWT	Advanced Wastewater Treatment
BMES	Bureau of Marketing and Extension Services
BMRRD	Bureau of Marine Resource Regulation and Development
BP	Before Present
BRD	Bycatch Reduction Devices
LP	Bureau of Submerged Lands and Preserves
BSRR	Bureau of Sanctuaries and Research Reserves
CAA	Clean Air Act
CARL	Conservation and Recreation Lands
CBRA	Coastal Barrier Resources Act of 1972
CBRS	Coastal Barrier Resources System
CCC	Coastal Coordinating Council (Florida)
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CDP	Census Designated Place
CFR	Code of Federal Regulations
CMWG	Channel Marking Working Group
CSA	Continental Shelf Associates
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act of 1972
DARRF	Damage Assessment and Restoration Revolving Fund
DBS	Division of Beaches and Shores
DCA	Department of Community Affairs
DEIS/MP	Draft Environmental Impact Statement/Management Plan
DEMA	Dive Equipment Manufacturers Association
DMR	Department of Marine Resources (Monroe County)
DO	Dissolved Oxygen
DRI	Development of Regional Impact
EIS	Environmental Impact Statement
EMAP	Environment Monitoring and Assessment Program
ENP	Everglades National Park
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F.S.	Florida Statutes
FAA	Federal Aviation Act of 1958
FAC	Florida Administrative Code
FAP	Federal Archaeological Program
FCD	Flood Control District
FCMP	Florida Coastal Management Program
FCREPA	Florida Committee on Rare and Endangered Plants and Animals
FCRES	Florida Committee on Rare and Endangered Species
FDA	Florida Department of Agriculture
FDACS	Florida Department of Agriculture and Consumer Services

<b>Acronym</b>	<b>Meaning</b>
FDBS	Florida Division of Beaches and Shores
FDCA	Florida Department of Community Affairs
FDEP	Florida Department of Environmental Protection
FDHR	Florida Division of Historical Resources
FDHRS	Florida Department of Health and Rehabilitative Services
FDMR	Florida Division of Marine Resources
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FDNR	Florida Department of Natural Resources
FDOC	Florida Department of Commerce
FDI	Florida Department of the Interior
FDOS	Florida Department of State
FDOT	Florida Department of Transportation
FDRP	Florida Division of Recreation and Parks
FDSL	Florida Division of State Lands
FEIS	Final Environmental Impact Statement
FGFWFC	Florida Game and Fresh Water Fish Commission
FDHRS	Florida Department of Health and Rehabilitative Services
FDMR	Florida Division of Marine Resources
FIO	Florida Institute of Oceanography
FIRE	Finance, Insurance, and Real Estate Trades
FCAA	Florida Keys Aqueduct Authority
FKARA	Florida Keys Artificial Reef Association
FKNMS	Florida Keys National Marine Sanctuary
FKNMSPA	Florida Keys National Marine Sanctuary and Protection Act
FMFC	Florida Marine Fisheries Commission
FMP	Florida Marine Patrol
FMP	Fishery Management Plan
FMRI	Florida Marine Research Institute
FNAI	Florida Natural Areas Inventory
FPS	Florida Park Service
FWIA	Fish and Wildlife Improvement Act
FWS	Fish and Wildlife Service (U.S. Dept. of Interior)
GDM	General Design Memorandum
GIS	Geographic Information System
GPS	Global Positioning System
HAPC	Habitat Area of Particular Concern
HAZMAT	Hazardous Materials
IMC	Interagency Management Committee
ITQ	Individual Transferrable Quota
JPCRSP	John Pennekamp Coral Reef State Park
LA	Lacey Act
LATF	Land Acquisition Trust Fund
LEO	Law Enforcement Officer
LKNMS	Looe Key National Marine Sanctuary
MBTA	Migratory Bird Treaty Act
MCMCD	Monroe County Mosquito Control District
MFCMA	Magnuson Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MOA	Memoranda of Agreement
MOU	Memoranda of Understanding
MPPRCA	Marine Plastic Pollution Research and Control Act of 1987
MPRSA	Marine Protection, Research, and Sanctuaries Act

<b><u>Acronym</u></b>	<b><u>Meaning</u></b>
NCP	National Contingency Plan
NDP	Natural Disaster Planning
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NFWF	National Fish and Wildlife Foundation
NGOs	Nongovernmental Organizations
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMS	National Marine Sanctuary
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service (NOAA)
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPS	Nonpoint Source
NURC	National Underwater Research Center
OCRM	Office of Ocean and Coastal Resource Management
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
ODA	Ocean Dumping Act of 1972
OFMAS	Office of Fisheries Management and Assistance Services
OFW	Outstanding Florida Water
ONRW	Outstanding Natural Resource Waters
OPA	Oil Pollution Act of 1990
OPS	Office of Protected Species
ORCA	Office of Ocean Resources Conservation and Assessment (NOAA)
OSDS	On-site Disposal System
OSP	Optimum Sustainable Population
PADI	Professional Association of Dive Instructors
PAED	Planning Analysis Area/Enumeration District
PL	Public Law
PRP	Potentially Responsible Parties
PSA	Public Service Announcement
PSD	Prevention of Significant Deterioration Provisions
PWSA	Port and Waterways Safety Act
RHA	Rivers and Harbors Act
SAV	Submerged Aquatic Vegetation
SCR	Submerged Cultural Resources
SEA	Strategic Environmental Assessments Division (ORCA, NOAA)
SEFSC	Southeast Fisheries Science Center
SFRC	South Florida Research Center
SFWMD	South Florida Water Management District
SHPO	State Historic Preservation Officer
SLA	Submerged Land Act of 1953
SOC	Save Our Coasts
SOR	Save Our Rivers
SPAs	Sanctuary Preservation Areas
SPF	Standard Project Flood
SPL	Saltwater Products License
SRD	Sanctuaries and Reserves Division (OCRM, NOAA)
SRS	Shark River Slough
SWD	Solid Waste Disposal

## Acronyms

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<b><u>Acronym</u></b>	<b><u>Meaning</u></b>
SWIM	Surface Water Improvement and Management Act
SWM	Stormwater Management
TDC	Tourism Development Council
TNC	The Nature Conservancy
TSRP	Taylor Slough Rainfall Plan
UIC	Underground Injection Control
ULV	Ultra Low Volume
UNCW	University of North Carolina, Wilmington
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDOC	United States Department of Commerce
USDOI	United States Department of the Interior
USDOS	United States Department of State
USDOT	United States Department of Transportation
USGS	United States Geological Survey
VTSS	Vessel Traffic Separation Schemes
WCAs	Water Conservation Areas
WQBELs	Water Quality Based Effluent Limitations
WWTP	Wastewater Treatment Plant

## Glossary of Technical Terms

**accretion-** growth or increase in size by gradual external addition

**ad valorem-** according to value; imposed at a rate percent of the value as stated in an invoice

**ahermatypic-** non reef-building corals

**anaerobic-** capable of living or growing in an environment lacking free oxygen

**annelids-** any of various worms with cylindrical segmented bodies

**aquaculture-** the cultivation of marine life for harvest and utilization by humans

**arboreal-** relating to, or like, a tree; in referring to species, those that inhabit or frequent trees

**ascidians-** "sack-like" tunicates; animals in which the larval stage resembles a tadpole but the adult is sedentary and sack-like (e.g. sea squirts)

**backcountry-** primarily referring to the Florida Bay area of the Keys' islands and waterways

**bathymetry-** water depth measurement information used to produce depth-contoured charts

**benthic communities-** bottom-dwelling flora and fauna

**Bermuda/Azores high-** the subtropical anticyclone positioned over the southern Atlantic Ocean in the Northern Hemisphere; it is most pronounced in spring and summer

**bioherm-** a mound, dome, or reef-like structure built up by, and composed almost exclusively of, the remains of sedentary organisms, such as corals, algae, or molluscs

**biota-** animal or plant life of a region considered as a total ecological entity

**block-faulted-** a type of normal faulting in which the Earth's crust is divided into structural or fault blocks of different elevations and orientations

**calcareous-** containing characteristics of calcium carbonate, calcium, or limestone

**capital facilities-** those buildings and structures required for the provision of public services

**Carolinian-** refers to organisms and physical characteristics of the southeastern U.S. coastline

**Census Designated Place-** closely settled communities without corporate limits or status

**common property resources-** resources that are not exclusively controlled by a single agent or source. Access to such resources is not restricted, and therefore the resources can be exploited on a first-come, first-served basis

**convective storm-** storm characterized by vertically rising air

**corallimorphs-** false corals

**coralline-** any animal related to or resembling corals

**crenulated (corals)-** corals having tiny notches or scallops

**crinoids-** "sea lilies"; echinoderms that are suspension feeders with jointed arms and appendages that give a feathery appearance resembling a plant

**cyclonic storms/systems-** a windstorm with a violent whirling movement; a system of rotating winds over a vast area, spinning inward to a low pressure center (counterclockwise in the northern hemisphere) generally causing stormy weather

**defaunated-** indigenous animals are removed from a particular area

**desiccation-** removal of moisture; drying out

**detrital-** the accumulation of disintegrated material

**diurnal-** pertaining to or occurring in a day or each day; daily

**downzoning-** the practice of rezoning a parcel or parcels in a "lower" or more restrictive zoning category (e.g., a rezoning from multifamily residential to single-family residential) is considered downzoning; downzonings are often part of a growth management program employed when communities find that they have overzoned for the population growth which is desired

**downwelling-** a reverse vertical flow of water, moving from the ocean's surface to great depths; occurs at oceanic convergences

**echinoderms-** radially symmetrical animals that are exclusively marine and possess a spiny skin and a system of water filled canals that aids in feeding and locomotion. (e.g., sea urchins, sand dollars, and sea cucumbers)

**endangered species-** a species in danger of becoming extinct that is protected by the Endangered Species Act

**endemic-** restricted to or native to a particular area or region

**epibenthic-** organisms that live on the surface of a substrate, including motile organisms such as gastropods, sea urchins, sea stars, sea cucumbers, sea biscuits, and a wide variety of crustacea

**epifauna-** animals that live on the ocean bottom, either attached or moving freely over it

**epiphytic-** any organisms that grow on the blades of seagrasses, including algae, diatoms, and other encrusting organisms

**eutrophication-** the process by which nutrient-rich waters bring about a high level of biological productivity that may ultimately lead to reduced dissolved oxygen levels

**fauna-** animal life of a particular region

**flora-** plant life of a particular region

**Florida Current-** the segment of current between the Gulf of Mexico Loop Current and the Gulf Stream from the Dry Tortugas to the Southeastern tip of Florida, and confined by the 250-meter and 500-meter isobaths

**Florida reef tract-** the third largest barrier reef in the world, running from the Miami area southwest to the Dry Tortugas

**Floridan Aquifer-** the rock mass of South Florida that contains groundwater

**foraminifera-** an order of planktonic and benthic protozoans having a calcareous shell; perforations through which numerous pseudopodia protrude

**gastropods-** "Stomach footed" class of molluscs that have only one shell and usually move about on a muscular "foot" (e.g., snail, slug, cowry, limpet)

**gorgonian-** a type of octocoral (soft coral) commonly found in southeast Florida reefs at depths less than 30 meters; they include sea fans, sea plumes, sea whips, and sea rods

**Gulf of Mexico Loop Current-** major surface current in the Gulf of Mexico; enters through Yucatan Straits, flows clockwise into the east central portion of the Gulf, and exits through the Straits of Florida becoming the Florida current and eventually the Gulf Stream

**gyre-** circular spiral form; used mainly in reference to the circular motion of water in major ocean basins centered in the subtropic high-pressure regions

**halophytic-** type of plant that can survive in saltwater environments

**Holocene Era-** designating the present epoch of geologic time

**hookah-** an underwater breathing apparatus that supplies air to one or more divers through hoses attached to a compressor located on the surface

**hot spot-** an area of actual or potential trouble

**hydrography-** the study, description, and mapping of oceans, lakes, and rivers with an emphasis on navigation

**hydrology-** the science dealing with the nature, distribution, and movement of water on and below the Earth's surface

**hydroperiod-** hydrologic conditions that contribute to seasonally elevated surficial and groundwater flow conditions

**incorporated lands-** land areas under the jurisdiction of a municipal government; in Monroe County there are three incorporated areas: the cities of Key West, Layton, and Key Colony Beach; all other areas in the Keys fall under Monroe County's jurisdiction

**infaunal-** organisms that live buried in sediments, including a variety of polychaetes, burrowing crustaceans, and molluscs

**Infrastructure-** basic installations and facilities, such as roads, power plants, transportation, and communication systems

**Iron-pile lighthouse-** a lighthouse built on iron pilings that are threaded like a screw; the piling legs are screwed into the surface; this design allows water to pass through during storms

**Isobath-** line connecting points of equal depth

**Keystone species-** a single species whose activities determine community structure; a species whose presence is critical to that community

**Lithology-** the scientific study of rocks usually with the unaided eye or little magnification

**Live rock-** rock to which living marine organisms are attached

**Lower Keys-** that part of incorporated Monroe County south and/or west of the Seven Mile Bridge (i.e., Little Duck, Missouri and Ohio Keys, Bahia Honda, West Summerland/Spanish Harbor, and south to Stock Island)

**Mailboxes-** propeller-wash device treasure hunters use to blow sediment away from wrecks buried beneath the seabed

**Management alternative-** a bundle of management strategies that, when employed together, represent the means for achieving a desired level of protection within the Sanctuary

**Management strategy-** an action or physical measure taken to address a specific issue; a management strategy is combined with an implementation incentive or mechanism to induce behavior; an institutional arrangement with authority to act; and a financing scheme to support the costs of implementation

**Middle Keys-** that part of unincorporated segment of Monroe County between Seven Mile Bridge and Whale Harbor Bridge (i.e., Islamorada, Upper and Lower Matecumbe, Fiesta Key, Long Key, Conch Key, Walkers Island, Duck Key, Fat Deer Key, Marathon, and Pigeon Key)

**Military exclusion area-** a region or tract reserved for military uses, where unauthorized persons may not enter

**National Register of Historic Places-** a congressionally authorized register of historically significant places, and or objects that receive protection from alteration or demolition under law; alterations are subject to Historic Preservation Council approval and must not significantly change the character or associations of the place or object in question

**Nektonic-** highly motile organisms, such as fishes and squids that live in, or above, the seagrass canopy

**Nonpoint source pollutant discharges-** those pollutant discharges not associated with a specific location (e.g., urban and agricultural pesticide runoff)

**Nutrients-** any number of organic or inorganic compounds used by plants in primary production (typically nitrogen and phosphorous)

**Octocorals-** coral type that includes sea plumes, sea whips, gorgonians, and soft corals

**Oolitic-** made of a limestone composition consisting of many small grains of carbonate of lime cemented together

**Patch reef-** small circular or irregular reefs that arise from the floor of lagoons, behind barrier reefs, or within an atoll

**Pathogens-** any agent, most commonly a microorganism, capable of causing disease

**Personal watercraft-** a shallow-draft, jet drive watercraft on which the operator sits, kneels, or stands; excludes those vehicles piloted from inside the craft

**Planktonic-** organisms dependent on water movement and currents as their means of transportation, including phytoplankton, zooplankton, and ichthyoplankton

**Planning Analysis Area/Enumeration District-** aggregated subcounty areas used as a framework for compiling and analyzing census data; aggregated into three areas: Lower, Middle, and Upper Keys

**Pleistocene epoch-** the first epoch of the Quaternary Period of the Cenozoic Era, beginning approximately 10,000 years ago; characterized by major worldwide climatic fluctuations, the spreading and recession of continental ice sheets with concomitant rise and fall of sea levels, and the appearance of modern humans



**point source pollutant discharges-** the discharge of pollutants from a distinct and identifiable source, such as a sewer or industrial outfall pipe

**polychaeta-** class of annelid worms that includes bristle and feather duster worms

**potable water-** water that is safe to drink

**puerulus-** the transitional swimming stage of the spiny lobster

**seasonal population-** any group of organisms of the same species that occupy a given space at a particular time of year (defined as winter, spring, summer, fall, wet, or dry)

**sessile-** immobile organisms that are permanently fixed to the substrate

**sheet flow-** surface water runoff

**slough-** swamp bog or marsh; especially one that is part of an inlet or backwater

**solution holes-** depression in the Earth's surface caused by dissolving of substrate composed primarily of calcium carbonate

**southwest continental shelf-** the submerged shelf of land that slopes gradually from the exposed edge of the continent for a variable distance to the point where the steep descent to the ocean floor begins

**spur and groove-** coral formation endemic to fringing or bank reefs; spurs are usually composed of a framework of *Acropora palmata* that form ramparts protruding at right angles to the axis of the reef and projecting into the prevailing wind pattern; the spaces between the spurs are sand channels referred to as grooves

**storm surge-** water elevation change due especially to tropical or extratropical storms

**threatened species-** plant or animal species believed likely to move into the endangered category in the near future if causal factors at work continue to persist

**tourism units-** hotel/motel rooms, sites for camping and recreational vehicles, and vacation rentals

**toxicant-** a poisonous or toxic substance

**turbid-** the state of being clouded, opaqued, or obscured by suspended sediment

**unincorporated lands-** lands not under the jurisdiction of (and not receiving services from) a town or city

**Upper Keys-** that part of unincorporated portion of Monroe County north of Whale Harbor Bridge; geologically, the segment of the Keys comprised of exposed Miami Limestone substrate; includes the area from Marathon to Soldier Key

**vascular-** typically describes tubular structures involved in fluid transport

**viviparous-** bearing or bringing forth live young, as with most mammals

**zoanthids-** generally small anemone; may be colonial or solitary, and both symbiotic and free-living; the most common on the Florida reef tract is *Palythoa caribbea*, referred to as "golden sea mat"

**zone-** an area or region considered as separate and distinct from others because of its designated use, plant or animal life, etc.

**zoning-** the act of partitioning areas of land or water into sections dedicated to specific purposes and activities

# Metric Conversion Table

Linear Measurement	Area Measurement
<p>1 foot = 0.3048 meter</p> <p>1 meter = 3.28084 feet = 0.001 kilometer</p> <p>1 kilometer = 1,000 meters = 0.621371 statute mile</p> <p>1 statute mile = 5,280 feet = 1.60934 kilometers = 0.8689 nautical mile</p> <p>1 nautical mile = 6,076.12 feet = 1.852 kilometers = 1.15078 statute miles</p>	<p>1 acre = 43,560 square feet = 4,046.86 square meters = 0.404686 hectare = 0.0015625 square statute mile</p> <p>1 hectare = 2.47105 acres = 10,000 square meters = 0.01 square kilometer = 0.003861 square statute mile</p> <p>1 square kilometer = 247.105 acres = 100 hectares = 0.386102 square statute mile</p> <p>1 square statute mile = 640 acres = 258.999 hectares = 2.58999 square kilometers = 0.755 square nautical mile</p> <p>1 square nautical mile = 847.5443 acres = 3.43 square kilometers = 1.324288 square statute miles</p>
Mass Measurement	Unit Abbreviations
<p>1 pound = 0.002 ton = 0.453592 kilogram</p> <p>1 ton = 2,000 pounds = 0.907185 metric ton</p> <p>1 kilogram = 2.20462 pounds = 0.001 metric ton</p> <p>1 metric ton = 2,240 pounds = 1.10231 tons</p>	<p>foot (ft)</p> <p>hectare (ha)</p> <p>kilometer (km)</p> <p>meter (m)</p> <p>nautical mile (nmi)</p> <p>pound (lb)</p> <p>square kilometer (km<sup>2</sup>)</p> <p>square meter (m<sup>2</sup>)</p> <p>square nautical mile (nmi<sup>2</sup>)</p> <p>square statute mile (mi<sup>2</sup>)</p> <p>statute mile (mi)</p>

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